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Description of document: National Aeronautics and Space Administration (NASA)
Contract for Deorbit of the International Space Station by
SpaceX 2023-2024

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Government Information Specialist
c/o NASA Headquarters
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Washington, DC 20546
Email: hq-foia@mail.nasa.gov
[Online FOIA Portal](#)
[FOIA.gov](#)

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National Aeronautics and Space Administration



Headquarters

Washington, DC 20546-0001

September 10, 2024

Reply to attn. of:

Office of Communications
History and Information Services Division

Re: FOIA Tracking Number 24-00986-F-JSC

This is our final response to your Freedom of Information Act (FOIA) request to the National Aeronautics and Space Administration (NASA), dated June 28, 2024, and received in this office on July 1, 2024. Your request was assigned the above-referenced tracking number. You seek:

NASA Johnson Space Center contract number 80JSC024CA002, awarded to Space Exploration Technologies Corp. on June 26, 2024 for services relating to the deorbit of the International Space Station.

- 1) a copy of the the contract*
- 2) the contract file checklist (list of documents in the contract file)*
- 3) the post-award kick-off meeting slides, if available*

In response to your request, we conducted a search of NASA's Office of Procurement using the information in your request. That/Those search(es) identified records responsive to your request. We reviewed the responsive records under the FOIA to determine whether they may be disclosed to you. Based on that review, this office is providing the following:

518 pages are released in full;
206 pages are withheld in full or part.

NASA redacted from the enclosed documents certain information pursuant to the following FOIA exemptions:

Exemption 4, 5 U.S.C. § 552(b)(4)

Exemption 4 protects trade secrets and commercial or financial information obtained from a person that is privileged or confidential. See 5 U.S.C. § 552(b)(4). The Supreme Court of the United States has held that where commercial or financial information is both customarily and actually treated as private by its owner and provided to the government under an assurance of privacy, the information is “confidential” within the meaning of 5 U. S. C. §552(b)(4). *Food Marketing Institute v. Argus Leader Media*, 139 S. Ct. 2356 (2019). Thus, NASA invokes exemption 4 to protect pricing, unique technical approaches developed at private expense, trade secrets, and key employee names and biographical information.

Fees

Provisions of the FOIA allow us to recover part of the cost of complying with your request. In this instance, because the cost is below the \$50 minimum, there is no charge.

Appeal

You have the right to appeal my action regarding your request. Your appeal must be received within 90 days of the date of this response. Please send your appeal to:

Administrator
NASA Headquarters
Executive Secretariat
ATTN: FOIA Appeals
MS 9R17
300 E Street S.W.
Washington, DC 20546

Both the envelope and letter of appeal should be clearly marked, “Appeal under the Freedom of Information Act.” You must also include a copy of your initial request, the adverse determination, and any other correspondence with the FOIA office. In order to expedite the appellate process and ensure full consideration of your appeal, your appeal should contain a brief statement of the reasons you believe this initial determination should be reversed. Additional information on submitting an appeal is set forth in the NASA FOIA regulations at 14 C.F.R. § 1206.700.

Assistance and Dispute Resolution Services

If you have any questions, please feel free to contact me at robert.s.young@nasa.gov. For further assistance and to discuss any aspect of your request you may also contact:

Stephanie Fox
FOIA Public Liaison
Freedom of Information Act Office
NASA Headquarters
300 E Street, S.W., 5P32
Washington D.C. 20546

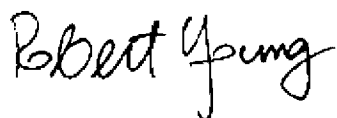
Phone: 202-358-1553

Email: Stephanie.K.Fox@nasa.gov

Additionally, you may contact the Office of Government Information Services (OGIS) at the National Archives and Records Administration to inquire about the FOIA mediation services it offers. The contact information for OGIS is as follows: Office of Government Information Services, National Archives and Records Administration, 8601 Adelphi Road-OGIS, College Park, Maryland 20740-6001, e-mail at ogis@nara.gov; telephone at 202-741-5770; toll free at 1-877-684-6448; or facsimile at 202-741-5769.

Important: Please note that contacting any agency official including myself, NASA's FOIA Public Liaison, and/or OGIS is not an alternative to filing an administrative appeal and does not stop the 90 day appeal clock.

Sincerely,

A handwritten signature in black ink that reads "Robert Young". The signature is written in a cursive, slightly slanted style.

Government Information Specialist

Enclosures

SOLICITATION, OFFER, AND AWARD

1. This Contract is a Rated Order under the Defense Priorities and Allocations System (DPAS) - Code of Federal Regulations - at 15 CFR 700.

RATING
DO-C9

PAGE OF PAGES
1 | 630

2. CONTRACT NUMBER 80JSC024CA002	3. SOLICITATION NUMBER 80JSC023R0003	4. TYPE OF SOLICITATION <input type="checkbox"/> SEALED B D (IFB) INVITATION FOR BID <input checked="" type="checkbox"/> NEGOTIATED (RFP) REQUEST FOR PROPOSAL	5. DATE ISSUED	6. REQUISITION/PURCHASE NUMBER
7. ISSUED BY NASA Johnson Space Center 2101 NASA Parkway		CODE	8. ADDRESS OFFER TO (If other than item 7) Refer to Section L of the Solicitation	

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

SOLICITATION

9. Sealed offers in original and 1 copies for furnishings the supplies or services in the Schedule will be received at the place specified in item 8, or if hand carried, in the depository located in Section L.24 until local time (Hour) (Date)

CAUTION - LATE Submissions, Modifications, and Withdrawals: See Section L, Provision Number 52.214-7 or 52.215-1. All offers are subject to all terms and conditions contained in his solicitation.

10. FOR INFORMATION CALL:	A. NAME Ashley H. Chaves	B. TELEPHONE (NO COLLECT CALLS)		C. EMAIL ADDRESS
	AREA CODE	NUMBER	EXTENSION	

11. TABLE OF CONTENTS

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OFFER (Must be fully completed by offeror)

NOTE: Item 12 does not apply if the solicitation includes the provisions at 52.214-16, Minimum Bid Acceptance Period.

12. In compliance with the above, the undersigned agrees, if this offer is accepted within 365 calendar days (60 calendar days unless a different period is inserted by the offeror) from the date for receipt of offers specified above, to furnish any or all items upon which prices are offered at the set opposite each item, delivered at the designated point(s), within the time specified in the schedule.

13. DISCOUNT FOR PROMPT PAYMENT (See Section I, Clause Number 52.232-8)	10 CALENDAR DAYS (%)	20 CALENDAR DAYS (%)	30 CALENDAR DAYS (%)	CALENDAR DAYS (%)
	0	0	0	0
14. ACKNOWLEDGMENT OF AMENDMENTS (The offeror acknowledges receipt of amendments to the SOLICITATION for offerors and related documents numbered and dated):	AMENDMENT NUMBER	DATE	AMENDMENT NUMBER	DATE
	Amendment 7	1/30/2024	Amendment 6	1/25/2024
	Amendment 5	12/15/2023	Amendment 4,3,2,1	12/5/2023

15A. NAME AND ADDRESS OF OFFEROR Space Exploration Technologies Corp. 1 Rocket Rd Hawthorne, CA 90250	CODE 3BVL8	FACILITY 3BVL8	16. NAME AND THE TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)
15B. TELEPHONE NUMBER AREA CODE NUMBER EXTENSION (b) (6)	<input type="checkbox"/> 15C. CHECK IF REMITTANCE ADDRESS IS DIFFERENT FROM ABOVE - ENTER SUCH ADDRESS IN SCHEDULE.		17. SIGNATURE
			18. OFFER DATE 2/27/2024

AWARD (To be completed by Government)

19. ACCEPTED AS TO ITEMS NUMBERED	20. AMOUNT	21. ACCOUNTING AND APPROPRIATION
22. AUTHORITY FOR USING OTHER THAN FULL OPEN COMPETITION UNDER THE UNITED STATES CODE AT: <input type="checkbox"/> 10 U.S.C. 3204(a) <input type="checkbox"/> 41 U.S.C. 3304(a) ()		23. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified)
24. ADMINISTERED BY (If other than item 7) NASA Johnson Space Center 2101 NASA Parkway Houston, TX 77058-3696		25. PAYMENT WILL BE MADE BY CODE https://www.nssc.nasa.gov/vendorpayment
26. NAME OF CONTRACTING OFFICER (Type or print) Audrey C. Montgomery		27. UNITED STATES OF AMERICA Audrey Montgomery Digitally signed by Audrey Montgomery Date: 2024.06.26 08:30:30 -0500 (Signature of Contracting Officer)
		28. AWARD DATE 6/26/2024

IMPORTANT - Award will be made on this Form, or on Standard Form 26, or by other authorized official written notice.

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STANDARD FORM 33 (REV. 12/2022)
Prescribed by GSA - FAR (48 CFR) 53.214 (c)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE	PAGE 1 OF 47 PAGES
2. AMENDMENT/MODIFICATION NUMBER 0008	3. EFFECTIVE DATE 05/09/2024	4. REQUISITION/PURCHASE REQUISITION NUMBER	5. PROJECT NUMBER (If applicable)	
6. ISSUED BY NASA Johnson Space Center 2101 NASA Parkway Houston TX 77058-3696	CODE	7. ADMINISTERED BY (If other than Item 6)		CODE
8. NAME AND ADDRESS OF CONTRACTOR (Number, street, county, State and ZIP Code)			(X)	9A. AMENDMENT OF SOLICITATION NUMBER 80JSC023R0003
			(X)	9B. DATED (SEE ITEM 11) 09/18/2023
				10A. MODIFICATION OF CONTRACT/ORDER NUMBER
				10B. DATED (SEE ITEM 13)
CODE	FACILITY CODE			

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended. is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or electronic communication which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

**13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NUMBER AS DESCRIBED IN ITEM 14.**

CHECK ONE	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NUMBER IN ITEM 10A.
<input type="checkbox"/>	
<input type="checkbox"/>	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
<input type="checkbox"/>	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
<input type="checkbox"/>	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible)

See continuation sheet on following page.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
	Audrey C. Montgomery		
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
	05/14/2024	Audrey Montgomery Digitally signed by Audrey Montgomery Date: 2024.05.09 17:58:12 -05'00' (Signature of Contracting Officer)	05/09/2024

The following clauses and provisions are hereby updated for purposes of the Final Proposal Revisions. Any change in these provisions supersedes the provision in the original solicitation.

1. Section C, Statement of Work:

- a. 2.5.e-f have been updated to clarify the expected interactions between the USDV Contract and International Partners.
- b. **2.6.h updated to add the words 'and locations'.**
- c. 2.9.6.b.9 added, “The Contractor shall deliver an USDV Interim SDIL Simulator (hardware and software) with the capability to perform risk-reduction, pathfinding development, and early characterization tests for joint test objectives unique to the USDV-ISS interface, including early joint tests specified in the JIVTP. The Interim SDIL Simulator may remain at SDIL for further early testing, or be transferred to the Contractor after early testing is complete.”
- d. 3.10.e.2.xx added reference to SOW 2.9.6.b.9
- e. 6.4 added “maintain”

2. Section I:

- a. Clause I.1, Clauses Incorporated by Reference
 - i. 52.203-17 version updated to Nov 2023
 - ii. 52.204-23 version updated to Dec 2023
 - iii. 52.219-8 version updated to Feb 2024
 - iv. 52.219-9 version updated to Sep 2023
 - v. 52.222-19 version updated to Feb 2024, now incorporated by reference (IBR)
 - vi. 52.244-6 version updated to Feb 2024, now IBR
 - vii. 1852.215-84 version updated to Nov 2023
 - viii. 1852.219-77 version updated to Oct 2023
 - ix. 1852.219-79 version updated to Oct 2023
 - x. 1852.223-74 version updated to Oct 2023
 - xi. 1852.246-74, Oct 2023 added, IBR
- b. I.10 now reserved
- c. I.18 now reserved

3. Section J:

- a. Attachment J-01 Data Requirements Descriptions – Attached in its entirety to reflect the following changes:
 - i. Updated ‘Contents’ section, item c to remove reference to Government Purpose Rights in USDV-01 Program Management Plan (PMP).
 - ii. Updated ‘Format’ section of USDV-31 Data Input for NASA Independent Verification and Validation (IV&V) and NASA Integration.
- b. Attachment J-05 Applicable Documents List – Attached in its entirety to reflect the following changes:

- i. SSP 51101 SRD date reverted to Nov 2023. An anticipated Feb 2024 date was published with the RFP. There are no technical changes to the document.
 - ii. SSP 51105 USDV Integration Plan – updated to Apr 2024, new PDF attached in SAM
 - c. J-40 Deliverable Item List updated – Attached in its entirety to reflect the following changes:
 - i. Clarified Remarks/Delivery Info column for deliverables for CORE-C2-2 USDV SDIL Simulator and CORE-C2-3 USDV Training Simulator.
 - ii. Added new line-item CORE C2-6 for deliverables specified in USDV SOW.
- 4. Section K:
 - a. K.3 52.204-8 version updated to Feb 2024
 - b. K.25 added 52.204-29 Dec 2023
- 5. Section L:
 - a. L.7 and L.20 POC updated to Audrey Montgomery
 - b. L.24 Proposal Arrangement, Page Limitation, Copies, & Due Dates
 - i. Final Proposal Revision information added as paragraph (c)
 - ii. Mission Suitability page limit increased from 225 to 240
 - iii. TA1 Specific Technical Understanding & Resources clarified to include *all* information required by L.27.1, including CLIN 2A, RDO, & RTO narratives
 - c. L.31 FAR 52.201-1, Sep 2023, added

PART I – THE SCHEDULE

- d. The Contractor shall ensure that products determined suitable for public release by the NASA and Contractor are labeled accordingly.
- e. The Contractor shall interact with ISS International Partners (IP) (e.g., Roscosmos, European Space Agency (ESA), Japanese Aerospace Exploration Agency (JAXA), Canadian Space Agency (CSA)) and their IP related entities to support the implementing arrangement between NASA and IPs for the decommissioning of the ISS.
- f. The Contractor shall perform technical interactions with IPs and IP related entities that are necessary for exchange of data, hardware, and software. It shall be the responsibility of the Contractor to seek and establish Technical Assistance Agreements or other appropriate Government Authorizations, as needed for technical interactions with the international partners. In the event a Contractor is unable to establish the required Technical Assistance Agreement or other appropriate Government authorizations with an ISS International Partner, the Contractor shall notify the NASA Contracting Officer with what steps and timeline the Contractor has taken to submit and obtain such authorizations, and the documented responses received by the ISS International Partner or United States government licensing agencies.

2.6 NASA INSIGHT AND APPROVAL

- a. The Contractor shall develop, implement, maintain, deliver, and operate in compliance with an Insight Management Plan in accordance with *Insight Management Plan (DRD USDV-5)*.
- b. The Contractor shall provide all NASA designated personnel (including support contractors) direct access to facilities, USDV flight hardware, Ground Support Equipment (GSE), personnel, and support services to accommodate the requirements as specified in the Contract. The Contractor shall provide access for all aspects of manufacture and processes, assembly, integration, test, evaluation, verification, training, sustaining, and operations of the USDV. The Contractor shall process and grant access to NASA designated personnel within 5 business days of the NASA request.
- c. The Contractor shall provide all NASA designated personnel (including support contractors) direct access, both remotely and onsite, to data and systems including, but not limited to: management information, schedule data, cost data (*applies to CPIF only*), technical data, documentation, drawings, patterns, models, analyses, products, manufactured product information, documents, changes, issues, non-conformances, waivers, deviations, anomalies, anomaly resolutions, imagery (still and video), audit results, corrective actions, quality assurance data, purchase orders, work orders, engineering resource planning, engineering order reports, configuration files, procedures (planned and as-run), timelines (planned and as-run), raw and processed telemetry, test environment configurations (planned and as-run), test data and results, risk management systems, quality management systems, configuration management systems, approval systems, requirement management and verification systems, metadata, supporting information, and operations data. This is applicable to data and systems used by and generated by the Contractor and its subcontractors in support of the USDV Contract.

The Contractor shall ensure aspects associated with access to data include the following:

PART I – THE SCHEDULE

1. Be in a useable and readable format within the Contractor database that is accessible by NASA at all times from onsite and remote locations for three years post USDV mission completion
 2. Provide this information for all aspects of the design, development, analysis, manufacture and processes, integration, test, evaluation, verification, acceptance, training, sustaining, and operations of the USDV
 3. Organize and catalog these records so that they may be rapidly located and retrieved by NASA to support ground and on-orbit operation
 4. Provide a method of sharing, reporting, collecting, recording, and accessing USDV data between NASA and NASA support personnel, the Contractor, and the Contractor's safety critical subcontractors/vendors to enable immediate collaborative access
 5. Retrieval from a single source of the Contractor's IT systems
 6. Access capability provided to NASA as soon as possible after contract award, but no later than 45 calendar days prior to the Mission Concept Review (MCR) kick-off and be maintained through the life of the USDV contract
 7. Manufacturing process, quality records, and any other data for the Government to perform a successful risk-based analysis/assessment (RBA) that will facilitate the identification of high-risk areas and closure of identified Product Assurance Actions (PAAs)
- d. The Contractor shall provide access to performance, anomaly, and anomaly resolution data on non-NASA missions that utilize hardware and software similar to USDV.
 - e. The Contractor shall notify NASA within 24 hours of any identified major nonconformances and report a summary of minor nonconformances during PMR for nonconformances identified at the Contractor and subcontractor level.
 - f. The Contractor shall provide a NASA Resident office, with a maximum capacity of two (2) personnel, at the Contractor's facility for the life of the contract.
 - g. The Contractor shall provide advanced notice of and allow Government attendance at all activities (e.g., tests, audits, test readiness reviews, and pre-ship reviews (PSRs) of flight hardware).
 - h. The Contractor shall allow IP/Participant (e.g., Roscosmos, ESA, JAXA, CSA) personnel attendance at designated events and locations, when requested.
 - i. The Contractor shall provide the capability for NASA and its support service contractors to request, capture, and upload/download imagery of the USDV and ground support equipment for NASA use throughout all phases of the USDV contract.
 - j. In addition to NASA oversight and approval stipulated elsewhere in the contract, NASA approval is required for the following:
 1. The USDV System and subsystem (including software) baseline design and changes to the baseline design.
 2. Major nonconformances identified at Material Review Board (MRB).

PART I – THE SCHEDULE

- b. The Contractor shall develop, transfer, maintain and operate a configuration controlled USDV SDIL Simulator for use in the Houston ISS SDIL, for verification and validation of software requirements, ISS interface software development, certification and sustaining in accordance with *Specification for USDV SDIL Simulator for ISS Integration Testing (DRD USDV-47)* and the following:
1. The USDV SDIL Simulator shall use flight-like hardware for all components needed to meet mission objectives.
 2. The USDV SDIL Simulator shall have a complete complement for devices containing flight software (including firmware, programmable logic, and redundant strings) required to communicate with and through ISS, process commands and telemetry, and meet ISS interface requirements in SSP 51101, *U.S. Deorbit Vehicle Systems Requirements Document*.
 3. The USDV SDIL Simulator shall provide a flight like interface with the SDIL test facility in accordance with the ISS SDIL ICD per *Specification for USDV SDIL Simulator for ISS Integration Testing (DRD USDV-47)*.
 4. The USDV SDIL Simulator shall have the capability to verify the software loading process, including patch capability through ISS.
 5. The USDV SDIL Simulator shall have the capability to perform flight-following of the USDV with ISS as needed to follow on-orbit activities, reproduce, and troubleshoot on-orbit issues in the ISS to USDV interface, and allow for fast-turnaround mitigations for hardware or software issues found on-orbit, including patch mitigation.
 6. The USDV SDIL Simulator devices shall have the ability to load and execute the actual flight software identically to the actual flight avionics hardware with regard to functionality, timing, and performance.
 7. The USDV SDIL Simulator models and simulations shall be assessed for flight realism in the ISS environment and certified to provide sufficient fidelity to perform verification (Model anchoring) and validation, including the ISS/USDV/Ground Segment End to End Test and the ISS integrated software stage test in accordance with *Models and Simulations (DRD USDV-39)*.
 8. The Contractor shall perform and deliver an assessment of the differences between the full list of actual USDV flight hardware and components used in the USDV SDIL Simulator in accordance with *Specification for USDV SDIL Simulator for ISS Integration Testing (DRD USDV-47)*. This assessment shall include Model anchoring, alternate test facilities and their scope, historical performance issues, supplier quality limitations, and exceptions to test-as-you-fly.
 9. The Contractor shall deliver an USDV Interim SDIL Simulator (hardware and software) with the capability to perform risk-reduction, pathfinding development, and early characterization tests for joint test objectives unique to the USDV-ISS interface, including early joint tests specified in the JIVTP. The Interim SDIL Simulator may remain at SDIL for further early testing, or be transferred to the Contractor after early testing is complete.

PART I – THE SCHEDULE

- xxvii. Updated Life-Cycle costs
2. CDR Data Products Delivered:
- i. Initial *USDV Launch Site Integration Plan (LSIP)* (**DRD USDV-40**)
 - ii. Initial *USDV Launch Commit Criteria (LCC)* (**DRD USDV-42**)
 - iii. Initial *USDV GNC Models and Data* (**DRD USDV-45**), Part B
 - iv. Final *Imagery Plan* (**DRD USDV-28**)
 - v. Final *USDV Transportation and Logistics Requirements Plan* (**DRD USDV-29**)
 - vi. Final *Data Input for NASA Integration and Independent Verification and Validation (IV&V)* (**DRD USDV-31**)
 - vii. Final *Models and Simulation Plan* (**DRD USDV-39**)
 - viii. Final *Verification and Validation Plan* (**DRD USDV-26**)
 - ix. Final *USDV GNC Models and Data* (**DRD USDV-45**), Part A
 - x. Updates to *TRL Assessment and Technology Maturation Plan* (**DRD USDV-23**)
 - xi. Update *USDV Spacecraft Readiness Plan* (**DRD USDV-30**)
 - xii. Update *Assembly, Integration and Test (AI&T) Plan* (**DRD USDV-32**)
 - xiii. Update *Command and Telemetry Dictionary* (**DRD USDV-37**)
 - xiv. Update *Operations Data Book* (**DRD USDV-38**)
 - xv. Update *Qualification and Acceptance Plan* (**DRD USDV-44**)
 - xvi. Mass Properties in accordance with *Mass Properties Report* (**DRD USDV-34**)
 - xvii. CAD models in accordance with *Engineering Computer-Aided Design (CAD) Models* (**DRD USDV-35**)
 - xviii. Final *Specification for USDV Hardware In The Loop Test Bed* (**DRD USDV-46**)
 - xix. Final *Specification for USDV SDIL Simulator for ISS integration testing* (**DRD USDV-47**)
 - xx. Interim USDV SDIL Simulator (reference SOW 2.9.6.b.9)
3. CDR Jointly Developed Products and Related Activities: The Contractor shall perform activities, support reviews, follow processes, and provide products in accordance with SSP 51105, *U.S. Deorbit Vehicle Integration Plan*, and for this Review:
- i. Interface requirements planning:
 - a) Baseline USDV-to-ISS ICD

PART I – THE SCHEDULE

including response to pages from ISS MER Manager within 15 minutes of receipt

2. Report to the ISS MER in MCC-H or conduct Remote MER operations within 2 hours upon the request of the ISS MER Manager, during quiescent operations
3. Dedicated ISS MER support, including expertise covering the applicable USDV subsystems, in MCC-H and supplemented with Remote MER, if required, for major on-orbit activities conducted using the USDV as follows:
 - i. USDV Launch, orbit insertion, appendage deployments
 - ii. Initial Activation and Checkouts of all USDV subsystems, including any in-flight Demonstrations
 - iii. USDV Rendezvous and Docking to ISS
 - iv. Initial ISS translational maneuvers, initial ISS Debris Avoidance Maneuvers, initial ISS attitude control operations, and all ISS attitude control operations for Crew Docking and Undocking
 - v. Final de-orbit operations beginning with the orbit shaping burn(s) until final splashdown of the ISS is confirmed
- p. The Contractor shall deliver *Post Dock Assessment (Post Launch and Docking) (DRD USDV-43)*.
- q. The Contractor shall provide flight operations support in accordance with Section 2.15 *Flight Operations*.

6.3.3 DEORBIT READINESS REVIEW (DORR)

The DORR will be held approximately 1 month prior to the orbit shaping burn(s) and reentry burn. The DORR confirms the overall readiness to proceed with ISS deorbit. This review encompasses readiness statuses from all NASA and International Partner disciplines and the USDV Contractor. Closure of open items from the FRR are assessed, and any remaining issues are assessed for risk to flight operations.

- a. NASA will lead the review, with Contractor participation.
- b. The Contractor shall participate and provide subject matter expertise and closure of open items from all previous reviews at the DORR.
- c. The Contractor shall provide presentation materials as requested by NASA.

6.3.4 POST MISSION SUPPORT

The Contractor shall provide subject matter expertise, analysis, and input in response to NASA's development of post mission reports and lessons learned.

6.4 PARTS

The Contractor shall acquire, fabricate, test, qualify, configuration manage, maintain, and store parts, materials, and replacement units ordered by NASA.

7.0 SPECIAL TASKS AND STUDIES (CLIN 5)

The overall Objective of CLIN 5 is the performance of special tasks and studies necessary to

PART II – CONTRACT CLAUSES**SECTION I - CONTRACT CLAUSES****I.1 LISTING OF CLAUSES INCORPORATED BY REFERENCE**

Clause(s) at the beginning of this Section are incorporated by reference, with the same force and effect as if they were given in full text. Clauses incorporated by reference which require a fill-in by the Government include the text of the affected paragraph(s) only. This does not limit the clause to the affected paragraph(s). The Contractor is responsible for understanding and complying with the entire clause.

The following contract clauses pertinent to this section are hereby incorporated by reference:

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)

CLAUSE NUMBER	DATE	TITLE
52.202-1	JUN 2020	DEFINITIONS
52.203-3	APR 1984	GRATUITIES
52.203-5	MAY 2014	COVENANT AGAINST CONTINGENT FEES
52.203-6	JUN 2020	RESTRICTIONS ON SUBCONTRACTOR SALES TO THE GOVERNMENT ALTERNATE I NOV 2021
52.203-7	JUN 2020	ANTI-KICKBACK PROCEDURES
52.203-8	MAY 2014	CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY
52.203-10	MAY 2014	PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY
52.203-12	JUN 2020	LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS
52.203-13	NOV 2021	CONTRACTOR CODE OF BUSINESS ETHICS AND CONDUCT
52.203-14	NOV 2021	DISPLAY OF HOTLINE POSTER(S) Fill In: Inspector General Hotline Posters may be obtained from https://oig.nasa.gov/hotline.html
52.203-17	NOV 2023	CONTRACTOR EMPLOYEE WHISTLEBLOWER RIGHTS AND REQUIREMENT TO INFORM EMPLOYEES OF WHISTLEBLOWER RIGHTS
52.203-19	JAN 2017	PROHIBITION ON REQUIRING CERTAIN INTERNAL CONFIDENTIALITY AGREEMENTS OR STATEMENTS
52.204-2	MAR 2021	SECURITY REQUIREMENTS

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CLAUSE NUMBER	DATE	TITLE
52.204-4	MAY 2011	PRINTED OR COPIED DOUBLE-SIDED ON POSTCONSUMER FIBER CONTENT PAPER
52.204-9	JAN 2011	PERSONAL IDENTITY VERIFICATION OF CONTRACTOR PERSONNEL
52.204-10	JUN 2020	REPORTING EXECUTIVE COMPENSATION AND FIRST-TIER SUBCONTRACT AWARDS
52.204-13	OCT 2018	SYSTEM FOR AWARD MANAGEMENT MAINTENANCE
52.204-18	AUG 2020	COMMERCIAL AND GOVERNMENT ENTITY CODE MAINTENANCE
52.204-19	DEC 2014	INCORPORATION BY REFERENCE OF REPRESENTATIONS AND CERTIFICATIONS
52.204-23	DEC 2023	PROHIBITION ON CONTRACTING FOR HARDWARE, SOFTWARE, AND SERVICES DEVELOPED OR PROVIDED BY KASPERSKY LAB AND OTHER COVERED ENTITIES
52.204-25	NOV 2021	PROHIBITION ON CONTRACTING FOR CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT
52.209-6	NOV 2021	PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT
52.209-9	OCT 2018	UPDATES OF PUBLICLY AVAILABLE INFORMATION REGARDING RESPONSIBILITY MATTERS
52.209-10	NOV 2015	PROHIBITION ON CONTRACTING WITH INVERTED DOMESTIC CORPORATIONS
52.210-1	NOV 2021	MARKET RESEARCH
52.211-5	AUG 2000	MATERIAL REQUIREMENTS
52.211-15	APR 2008	DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS
52.215-2	JUN 2020	AUDIT AND RECORDS-NEGOTIATION
52.215-8	OCT 1997	ORDER OF PRECEDENCE-UNIFORM CONTRACT FORMAT
52.215-10	AUG 2011	PRICE REDUCTION FOR DEFECTIVE CERTIFIED COST OR PRICING DATA

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CLAUSE NUMBER	DATE	TITLE
52.215-11	JUN 2020	PRICE REDUCTION FOR DEFECTIVE CERTIFIED COST OR PRICING DATA-MODIFICATIONS
52.215-12	JUN 2020	SUBCONTRACTOR CERTIFIED COST OR PRICING DATA
52.215-13	JUN 2020	SUBCONTRACTOR CERTIFIED COST OR PRICING DATA-MODIFICATIONS
52.215-14	NOV 2021	INTEGRITY OF UNIT PRICES
52.215-15	OCT 2010	PENSION ADJUSTMENTS AND ASSET REVERSIONS
52.215-18	JUL 2005	REVERSION OR ADJUSTMENT OF PLANS FOR POSTRETIREMENT BENEFITS (PRB) OTHER THAN PENSIONS
52.215-19	OCT 1997	NOTIFICATION OF OWNERSHIP CHANGES
52.215-21	NOV 2021	REQUIREMENTS FOR CERTIFIED COST OR PRICING DATA AND DATA OTHER THAN CERTIFIED COST OR PRICING DATA-MODIFICATIONS ALTERNATE II OCT 1997
52.215-23	JUN 2020	LIMITATIONS ON PASS-THROUGH CHARGES ALTERNATE I OCT 2009 <i>(Applies to CPIF only)</i>
52.216-7	AUG 2018	ALLOWABLE COST AND PAYMENT <i>(Applies to CPIF only) (Fill in = 30th)</i>
52.219-8	FEB 2024	UTILIZATION OF SMALL BUSINESS CONCERNS
52.219-9	SEP 2023	SMALL BUSINESS SUBCONTRACTING PLAN ALTERNATE II NOV 2016
52.219-16	SEP 2021	LIQUIDATED DAMAGES-SUBCONTRACTING PLAN
52.219-28	MAR 2023	POST-AWARD SMALL BUSINESS PROGRAM REREPRESENTATION
52.222-1	FEB 1997	NOTICE TO THE GOVERNMENT OF LABOR DISPUTES
52.222-3	JUN 2003	CONVICT LABOR
52.222-4	MAY 2018	CONTRACT WORK HOURS AND SAFETY STANDARDS -OVERTIME COMPENSATION
52.222-19	FEB 2024	CHILD LABOR – COOPERATION WITH AUTHORITIES AND REMEDIES
52.222-20	JUN 2020	CONTRACTS FOR MATERIALS, SUPPLIES, ARTICLES, AND EQUIPMENT
52.222-21	APR 2015	PROHIBITION OF SEGREGATED FACILITIES

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CLAUSE NUMBER	DATE	TITLE
52.222-26	SEP 2016	EQUAL OPPORTUNITY
52.222-35	JUN 2020	EQUAL OPPORTUNITY FOR VETERANS
52.222-36	JUN 2020	EQUAL OPPORTUNITY FOR WORKERS WITH DISABILITIES
52.222-37	JUN 2020	EMPLOYMENT REPORTS ON VETERANS
52.222-40	DEC 2010	NOTIFICATION OF EMPLOYEE RIGHTS UNDER THE NATIONAL LABOR RELATIONS ACT
52.222-50	NOV 2021	COMBATING TRAFFICKING IN PERSONS ALTERNATE I MAR 2015
52.222-54	MAY 2022	EMPLOYMENT ELIGIBILITY VERIFICATION
52.223-5	MAY 2011	POLLUTION PREVENTION AND RIGHT-TO-KNOW INFORMATION
52.223-6	MAY 2001	DRUG-FREE WORKPLACE
52.223-11	JUN 2016	OZONE-DEPLETING SUBSTANCES AND HIGH GLOBAL WARMING POTENTIAL HYDROFLUOROCARBONS
52.223-18	JUN 2020	ENCOURAGING CONTRACTOR POLICIES TO BAN TEXT MESSAGING WHILE DRIVING
52.224-1	APR 1984	PRIVACY ACT NOTIFICATION
52.224-2	APR 1984	PRIVACY ACT
52.224-3	JAN 2017	PRIVACY TRAINING
52.225-1	OCT 2022	BUY AMERICAN-SUPPLIES ALTERNATE I OCT 2022
52.225-8	OCT 2010	DUTY-FREE ENTRY
52.225-13	FEB 2021	RESTRICTIONS ON CERTAIN FOREIGN PURCHASES
52.227-1	JUN 2020	AUTHORIZATION AND CONSENT
52.227-2	JUN 2020	NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT
52.227-3	APR 1984	PATENT INDEMNITY
52.227-11	MAY 2014	PATENT RIGHTS-OWNERSHIP BY THE CONTRACTOR
52.227-16	JUN 1987	ADDITIONAL DATA REQUIREMENTS
52.227-21	MAY 2014	TECHNICAL DATA DECLARATION, REVISION, AND WITHHOLDING OF PAYMENT-MAJOR SYSTEMS
52.227-22	JUN 1987	MAJOR SYSTEM-MINIMUM RIGHTS
52.228-7	MAR 1996	INSURANCE-LIABILITY TO THIRD PERSONS (<i>Applies to CPIF only</i>)
52.229-3	FEB 2013	FEDERAL, STATE, AND LOCAL TAXES (<i>Applies to FFP only</i>)

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CLAUSE NUMBER	DATE	TITLE
52.230-2	JUN 2020	COST ACCOUNTING STANDARDS <i>(Applies to CPIF only)</i>
52.230-6	JUN 2010	ADMINISTRATION OF COST ACCOUNTING STANDARDS <i>(Applies to CPIF only)</i>
52.232-1	APR 1984	PAYMENTS <i>(Applies to FFP only)</i>
52.232-8	FEB 2002	DISCOUNTS FOR PROMPT PAYMENT
52.232-11	APR 1984	EXTRAS <i>(Applies to FFP only)</i>
52.232-17	MAY 2014	INTEREST
52.232-22	APR 1984	LIMITATION OF FUNDS <i>(Applies to CPIF only)</i>
52.232-23	MAY 2014	ASSIGNMENT OF CLAIMS
52.232-25	JAN 2017	PROMPT PAYMENT ALTERNATE I FEB 2002
52.232-33	OCT 2018	PAYMENT BY ELECTRONIC FUNDS TRANSFER-SYSTEM FOR AWARD MANAGEMENT
52.232-39	JUN 2013	UNENFORCEABILITY OF UNAUTHORIZED OBLIGATIONS
52.232-40	MAR 2023	PROVIDING ACCELERATED PAYMENTS TO SMALL BUSINESS SUBCONTRACTORS
52.233-1	MAY 2014	DISPUTES ALTERNATE I DEC 1991
52.233-3	AUG 1996	PROTEST AFTER AWARD ALTERNATE I JUN 1985
52.233-4	OCT 2004	APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM
52.234-1	SEP 2016	INDUSTRIAL RESOURCES DEVELOPED UNDER TITLE III, DEFENSE PRODUCTION ACT
52.236-13	NOV 1991	ACCIDENT PREVENTION ALTERNATE I (NOV 1991)
52.237-2	APR 1984	PROTECTION OF GOVERNMENT BUILDINGS, EQUIPMENT, AND VEGETATION
52.239-1	AUG 1996	PRIVACY OR SECURITY SAFEGUARDS
52.242-1	APR 1984	NOTICE OF INTENT TO DISALLOW COSTS <i>(Applies to CPIF only)</i>
52.242-3	DEC 2022	PENALTIES FOR UNALLOWABLE COSTS <i>(Applies to CPIF only)</i>
52.242-4	JAN 1997	CERTIFICATION OF FINAL INDIRECT COSTS <i>(Applies to CPIF only)</i>
52.242-5	JAN 2017	PAYMENTS TO SMALL BUSINESS SUBCONTRACTORS
52.242-13	JUL 1995	BANKRUPTCY

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CLAUSE NUMBER	DATE	TITLE
52.243-1	AUG 1987	CHANGES-FIXED-PRICE ALTERNATE V (APR 1984) (<i>Applies to FFP only</i>)
52.243-2	AUG 1987	CHANGES-COST-REIMBURSEMENT ALTERNATE V(APR 1984) (<i>Applies to CPIF only</i>)
52.243-6	APR 1984	CHANGE ORDER ACCOUNTING
52.243-7	JAN 2017	NOTIFICATION OF CHANGES Fill in paragraph (b): “14 calendar days for items Fill in paragraph (d): “14 calendar days after receipt of all (b) 1 through 6 elements”
52.244-2	JUN 2020	SUBCONTRACTS Fill in paragraph (d): “None” Fill in paragraph (j): “None”
52.244-5	DEC 1996	COMPETITION IN SUBCONTRACTING
52.244-6	FEB 2024	SUBCONTRACTS FOR COMMERCIAL PRODUCTS AND COMMERCIAL SERVICES
52.245-1	SEP 2021	GOVERNMENT PROPERTY
52.245-9	APR 2012	USE AND CHARGES
52.246-24	FEB 1997	LIMITATION OF LIABILITY-HIGH-VALUE ITEMS
52.246-25	FEB 1997	LIMITATION OF LIABILITY-SERVICES
52.246-26	NOV 2021	REPORTING NONCONFORMING ITEMS
52.247-63	JUN 2003	PREFERENCE FOR US-FLAG AIR CARRIERS
52.248-1	JUN 2020	VALUE ENGINEERING
52.249-2	APR 2012	TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (<i>Applies to FFP only</i>)
52.249-6	MAY 2004	TERMINATION (COST-REIMBURSEMENT) (<i>Applies to CPIF only</i>)
52.249-8	APR 1984	DEFAULT (FIXED-PRICE SUPPLY AND SERVICE) (<i>Applies to FFP only</i>)
52.249-14	APR 1984	EXCUSABLE DELAYS
52.253-1	JAN 1991	COMPUTER GENERATED FORMS

II. NASA FAR SUPPLEMENT (48 CFR CHAPTER 18)

CLAUSE NUMBER	DATE	TITLE
1852.203-70	JUN 200	DISPLAY OF INSPECTOR GENERAL HOTLINE POSTERS
1852.203-71	AUG 2014	REQUIREMENT TO INFORM EMPLOYEES OF WHISTLEBLOWER RIGHTS
1852.215-84	NOV 2023	OMBUDSMAN

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CLAUSE NUMBER	DATE	TITLE
1852.216-89	AUG 2016	ASSIGNMENT AND RELEASE FORMS
1852.219-75	APR 2015	INDIVIDUAL SUBCONTRACTING REPORTS
1852.219-77	OCT 2023	NASA MENTOR-PROTÉGÉ PROGRAM
1852.219-79	OCT 2023	MENTOR REQUIREMENTS AND EVALUATION
1852.223-74	OCT 2023	DRUG- AND ALCOHOL-FREE WORKFORCE
1852.227-11	APR 2015	PATENT RIGHTS--OWNERSHIP BY THE CONTRACTOR
1852.227-88	APR 2015	GOVERNMENT-FURNISHED COMPUTER SOFTWARE AND RELATED TECHNICAL DATA.
1852.228-75	OCT 1988	MINIMUM INSURANCE COVERAGE
1852.235-70	DEC 2006	CENTER FOR AEROSPACE INFORMATION
1852.237-70	DEC 1988	EMERGENCY EVACUATION PROCEDURES
1852.237-72	JUN 2005	ACCESS TO SENSITIVE INFORMATION
1852.237-73	JUN 2005	RELEASE OF SENSITIVE INFORMATION
1852.242-78	APR 2001	EMERGENCY MEDICAL SERVICES AND EVACUATION
1852.246-74	OCT 2023	CONTRACTOR COUNTERFEIT ELECTRONIC PART DETECTION AND AVOIDANCE

(End of Clauses Incorporated by Reference)

**I.2 FAR 52.204-21 BASIC SAFEGUARDING OF COVERED CONTRACTOR
INFORMATION SYSTEMS. (NOV 2021)**

(a) *Definitions.* As used in this clause -

Covered contractor information system means an information system that is owned or operated by a contractor that processes, stores, or transmits Federal contract information.

Federal contract information means information, not intended for public release, that is provided by or generated for the Government under a contract to develop or deliver a product or service to the Government, but not including information provided by the Government to the public (such as on public Web sites) or simple transactional information, such as necessary to process payments.

Information means any communication or representation of knowledge such as facts, data, or opinions, in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audiovisual (Committee on National Security Systems Instruction (CNSSI) 4009).

Information system means a discrete set of information resources organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of information (44 U.S.C. 3502).

Safeguarding means measures or controls that are prescribed to protect information systems.

(b) *Safeguarding requirements and procedures.* (1) The Contractor shall apply the following basic safeguarding requirements and procedures to protect covered contractor information

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Conformance for each Critical Spare that notes location of Acceptance Data of each critical spare that is available for NASA retrieval and download in accordance with USDV Acceptance Data (DRD USDV-36).		
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**Date shall be no later than Offeror's proposed date specified in Clause F.3 *FAR 52-211-9*
DESIRED AND REQUIRED TIME OF DELIVERY

(End of clause)

I.9 FAR 52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (OCT 2022)

(a) Evaluation preference. (1) Offers will be evaluated by adding a factor of 10 percent to the price of all offers, except -

(i) Offers from HUBZone small business concerns that have not waived the evaluation preference; and

(ii) Otherwise successful offers from small business concerns.

(2) The factor of 10 percent shall be applied on a line-item basis or to any group of items on

which award may be made. Other evaluation factors described in the solicitation shall be applied before application of the factor.

(3) When the two highest rated offerors are a HUBZone small business concern and a large business, and the evaluated offer of the HUBZone small business concern is equal to the evaluated offer of the large business after considering the price evaluation preference, award will be made to the HUBZone small business concern.

(b) *Waiver of evaluation preference.* A HUBZone small business concern may elect to waive the evaluation preference, in which case the factor will be added to its offer for evaluation purposes.

Offeror elects to waive the evaluation preference.

(c) *Joint venture.* A HUBZone joint venture agrees that, in the performance of the contract, at least 40 percent of the aggregate work performed by the joint venture shall be completed by the HUBZone small business parties to the joint venture. Work performed by the HUBZone small business parties to the joint venture must be more than administrative functions.

(End of clause)

I.10 RESERVED

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disclosure prohibitions, with the minimum rights set forth in paragraph (b) of this clause.

(h) *Subcontracting*. The Contractor shall obtain from its subcontractors all data and rights therein necessary to fulfill the Contractor's obligations to the Government under this contract. If a subcontractor refuses to accept terms affording the Government those rights, the Contractor shall promptly notify the Contracting Officer of the refusal and shall not proceed with the subcontract award without authorization in writing from the Contracting Officer.

(i) *Relationship to patents or other rights*. Nothing contained in this clause shall imply a license to the Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Government.

(j) The Contractor agrees, except as may be otherwise specified in this contract for specific data deliverables listed as not subject to this paragraph, that the Contracting Officer may, up to three years after acceptance of all deliverables under this contract, inspect at the Contractor's facility any data withheld pursuant to paragraph (g)(1) of this clause, for purposes of verifying the Contractor's assertion of limited rights or restricted rights status of the data or for evaluating work performance. When the Contractor whose data are to be inspected demonstrates to the Contracting Officer that there would be a possible conflict of interest if a particular representative made the inspection, the Contracting Officer shall designate an alternate inspector.

(End of clause)

I.17 FAR 52.232-40 PROVIDING ACCELERATED PAYMENTS TO SMALL BUSINESS SUBCONTRACTORS. (MAR 2023)

(a)(1) In accordance with 31 U.S.C. 3903 and 10 U.S.C. 3801, within 15 days after receipt of accelerated payments from the Government, the Contractor shall make accelerated payments to its small business subcontractors under this contract, to the maximum extent practicable and prior to when such payment is otherwise required under the applicable contract or subcontract, after receipt of a proper invoice and all other required documentation from the small business subcontractor.

(2) The Contractor agrees to make such payments to its small business subcontractors without any further consideration from or fees charged to the subcontractor.

(b) The acceleration of payments under this clause does not provide any new rights under the Prompt Payment Act.

(c) Include the substance of this clause, including this paragraph (c), in all subcontracts with small business concerns, including subcontracts with small business concerns for the acquisition of commercial products or commercial services.

(End of clause)

I.18 RESERVED

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**ATTACHMENT J-05 APPLICABLE AND REFERENCE
DOCUMENTS LIST**

PART II – CONTRACT CLAUSES**TABLE ATTACHMENT J-05-01 APPLICABLE DOCUMENTS LIST (ADL)**

Document Number	Document Revision Document Date	Document Title
ANSI ESD S20.20-2021	2021 Edition	Protection Of Electrical And Electronic Parts, Assemblies And Equipment (Excluding Electrically Initiated Explosive Devices)
ANSI Z136.1-2022	2022 Edition	The American National Standard for Safe Use of Lasers
AS9100	D 2017	Quality Management Systems - Requirements for Aviation, Space, and Defense Organizations
AS9115	A	Quality Management System – Requirements for Aviation, Space and Defense Organizations – Deliverable Software (Supplement to 9100:2016)
ASTM Manual 36	2nd Edition	Safe Use of Oxygen and Oxygen Systems: Handbook for Design, Operation, and Maintenance: Second Edition
DI-MGMT-81861	C	Data Item Description (DID), Integrated Program Management Data and Analysis Report (IPMDAR) Including Data Exchange Instructions for Contract Performance Dataset (CPD) and Schedule Performance Dataset (SPD)
EIA-748	D January 2019	Earned Value Management Systems
Executive Order 13985		Advancing Racial Equity and Support for Underserved Communities Through the Federal Government
FIPS Pub 140-2	w/ Changes 1-4 December 2002	Security Requirements for Cryptographic Modules
FIPS Pub 140-3	March 2019	Security Requirements for Cryptographic Modules

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Document Number	Document Revision Document Date	Document Title
FIPS Pub 197	Updated May 2023	Advanced Encryption Standard (AES)
GEIA-STD-0005-2	A May 2012	Standard for Mitigating the Effects of Tin Whiskers in Aerospace and High Performance Electronics
GSFC-STD-8009	Baseline June 2019	Goddard Space Flight Center (GSFC) Wallops Flight Facility Range Safety Manual (RSM)
IPC-2220 Series per Performance Class 3	Fully Applicable per Performance Class 3 2221: B 2222: B 2223: E 2225: B/L 2226: A 2228: B/L	Family of Printed Board Design Documents
IPC-6010 Series	Fully Applicable 6011: B/L 6012: E w/ Amendment 1 and Space Addendum 6013: E 6015: B/L 6017: A 6018: DS	Family of Printed Board Performance Documents
IPC-CM-770	E January 2004	Component Mounting Guidelines For Printed Boards
IPC-J-STD-001HS	2021	Space And Military Applications Electronic Hardware Addendum To IPC J-STD-001H Requirements For Soldered Electrical And Electronic Assemblies
ISO 14644-1:2015	2nd Edition December 2015	Cleanrooms and Associated Controlled Environments, Part 1: Classification of air cleanliness by particle concentration.
ISS_OE_906	2021	Flight Safety Certificate Form
ITS-HBK-CUI	Version 2.0.0 December 2022	Controlled Unclassified Information Handbook

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Document Number	Document Revision Document Date	Document Title
JAI 2190.1	E	Export Services Team Operations Manual
JF288	June 2007	Statistical Information - Contractor Safety and Health Program
JPD 8500.1	B October 2020	JSC Environmental Excellence Policy
JPR 1040.4	A, with Admin Change 1 December 2020	JSC Emergency Management Plan
JPR 1700.1	L, with Change 4 December 2018	JSC Safety and Health Requirements
JPR 2310.1	B	JSC Knowledge Management Strategy
JPR 8550.1	C 2021	JSC Environmental Compliance Procedural Requirements
JPR 8553.1	C, Revalidated March 2019	JSC Environmental Management System Manual
JSC 12820	Current Revision	ISS Generic Operational Flight Rules, Volume B, Appendix B – Change Control
JSC 20793	D March 2017	Crewed Space Vehicle Battery Safety Requirements
JSC 35194	A	Mission Training Center Generic Simulation Interface Specification
JSC 36054	F	Systems Operation Data File (SODF) Management Plan (main book and Annexes 1-4)
JSC 36054 Annex 1	H	SODF Definition
JSC 36054 Annex 2	J	SODF Configuration Control Plan
JSC 36054 Annex 3	K	SODF Procedure Validation Plan
JSC 36054 Annex 4	J	SODF Preparation and Publication Plan
JSC 62809	E June 2022	Human Rated Spacecraft Pyrotechnic Specification
JSC 65795	M	NASA Docking System (NDS) Interface Definitions Document (IDD)

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Document Number	Document Revision Document Date	Document Title
JSC 65828	B w/ Change 1 July 2014	Structural Design Requirements and Factors of Safety for Spaceflight Hardware
JSC 66617	September 2013	ISS Passive Thermal Control Systems (PTCS) Analysis Guide
JSC 67035	A	Best Practices and Guidelines (BP&G) for Thin Wall Pressure Boundaries (TWPB) for Human Spaceflight Applications
JWI 1040.26	B March 2021	Hazardous Substance Spill/Release Response
JWI 2190.1	E August 2019	JSC Export Compliance
JWI 8553.1	B, Revalidated May 2021	EMS Aspect/Impact Assessment and EMP Process
KNPR 8715.3	L	KSC Safety Procedural Requirements
KSC-DE-512-SM	M November 2021	Facility Systems, Ground Support Systems, and Ground Support Equipment General Design Requirements
LSP-PD-120.05	B	Launch Telemetry Requirements
MGT-OA-019	B	On-Orbit Anomaly Resolution Process Work Instruction
MIL-PRF-38534	L December 2019	Hybrid Microcircuits, General Specification For
MIL-PRF-38535	M November 2022	Integrated Circuits (Microcircuits) Manufacturing, General Specification for
MIL-STD-1553	Rev. B Notice 2 September 8, 1986	Digital Time Division Command/Response Multiplex Data Bus
MSFC-SPEC-3746	Baseline April 2020	Flow-Induced Vibration Assessment Requirements for Metal Bellows and Flex hoses
NAII 2190.1	H September 2021	NASA Export Control Program Operations Manual
NASA JSC SN-C-0005	Rev D July 1998	Contamination Control Requirements

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Document Number	Document Revision Document Date	Document Title
NASA/TM-2020-220555	January 2020	NASA Meteoroid Engineering Model (MEM) Version 3
NASA/TP-2019-220448	December 2019	NASA Orbital Debris Engineering Model ORDEM 3.1 – Software User Guide
NASA-STD-2818	4.0 June 2015	Digital Television Standards for NASA
NASA-STD-2822	Baseline September 2013	Still and Motion Imagery Metadata Standard
NASA-STD-4005	A w/ Change 1 November 2021	Low Earth Orbit Spacecraft Charging Design Standard
NASA-STD-5005	D w/ Change 1 October 2017	Standard for the Design and Fabrication of Ground Support Equipment
NASA-STD-5012	B June 2016	Strength and Life Assessment Requirements for Liquid-Fueled Space Propulsion System Engine
NASA-STD-5017	B December 2022	Design and Development Requirements for Mechanisms
NASA-STD-5019	A w/ Change 3 August 2020	Fracture Control Requirements for Spaceflight Hardware
NASA-STD-5020	B August 2021	Requirements for Threaded Fastening Systems in Spaceflight Hardware
NASA-STD-6016	C September 2021	Standard Materials and Processes Requirements for Spacecraft

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Document Number	Document Revision Document Date	Document Title
NASA-STD-7009	A, with Change 1 December 2016	Standard for Models and Simulations
NASA-STD-7012	A February 2023	Leak Test Requirements
NASA-STD-8719.14	C November 2021	Process for Limiting Orbital Debris
NASA-STD-8719.24	A March 2022	NASA Payload Safety Requirements
NASA-STD-8739.1	B w/ Change 2 October 2021	Workmanship Standard for Polymeric Application on Electronic Assemblies
NASA-STD-8739.4	A w/ Change 4 April 2022	Workmanship Standard For Crimping, Interconnecting Cables, Harnesses, And Wiring
NASA-STD-8739.5	A w/ Change 2 October 2021	Workmanship Standard for Fiber Optic Terminations, Cable Assemblies, and Installation
NASA-STD-8739.6	B February 2021	Implementation Requirements for NASA Approved Workmanship Standards
NASA-STD-8739.8	B September 2022	Software Assurance and Software Safety
NF1018	December 2022	NF1018 Electronic Submission System (NESS) NASA Property in the Custody of Award Recipients
NIST SP 800-57	Part 1: Rev 5, May 2020 Part 2: Rev 1, May 2019	Recommendation for Key Management – Part 1: General and and Part 2: Best Practices for Key Management Organizations
NPD 1440.6	I September 2014	NASA Records Management
NPD 2190.1	B w/ Change 2	NASA Export Control Program
NPD 2810.1	F	NASA Information Security Policy
NPD 8500.1	C w/ Change 2 October 2018	NASA Environmental Management
NPD 8610.23	C, Revalidated June 2023	Launch Vehicle Technical Oversight Policy

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Document Number	Document Revision Document Date	Document Title
NPD 8610.24	C, Revalidated December 2020	Launch Services Program (LSP) Pre-Launch Readiness Reviews
NPD 8610.7	D w/ Change 3	NASA Launch Services Risk Mitigation Policy for NASA- Owned and/or NASA-Sponsored Payloads/Missions
NPR 1441.1	E w/ Change 3	NASA Records Management Program Requirements
NPR 1600.1	A w/ Change 1	NASA Security Program Procedural Requirements
NPR 2190.1	C	NASA Export Control Program
NPR 2810.1	F	Security of Information and Information Systems
NPR 2810.7	Baseline	Controlled Unclassified Information
NPR 6000.1	H	Requirements for Packaging, Handling, and Transportation for Aeronautical and Space Systems, Equipment, and Associated Components
NPR 7123.1	D	NASA System Engineering Processes and Requirements
NPR 7150.2	D	NASA Software Engineering Requirements
NPR 8530.1	B August 2016	NASA Sustainable Acquisitions
NPR 8553.1	C July 2020	NASA Environmental Management Program
NPR 8570.1	B August 2020	NASA Energy and Water Management Program
NPR 8580.1	A w/ Change 1 September 2017	NASA National Environmental Policy Act (NEPA) Management Requirements
NPR 8621.1	D w/ Change 4	NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating and Recordkeeping
NPR 8715.7	B	Payload Safety Program
NPR 8735.2	C w/ Change 2	Hardware Quality Assurance Program Requirements for Programs and Projects

PART II – CONTRACT CLAUSES

Document Number	Document Revision Document Date	Document Title
NPR 9501.2	E w/ Change 4	NASA Contractor Financial Management Reporting
NRRS 1441.1	Updated June 2023	NASA Records Retention Schedules
OB-MER-006	F	ISS MER Support Definition Document
OB-MER-035	A	ISS MER Notification, On Call and Scheduling Requirements
OIP 5.2.1.1		Operations Interface Procedures
OMB Circular A-130		Managing Information as a Strategic Resource
OSHA CSP 03-01-005		Voluntary Protection Program (VPP): Policies and Procedures Manual
SAE-AS-7928	Rev. C May 2019	Terminals, Lug: Splices, Conductor: Crimp Style, Copper, General Specification for
SMC-S-016	September 2014	Test Requirements for Launch, Upper-Stage, and Space Vehicles
SSCMAN 91-710 (Volumes 1-7)	December 2022	Range Safety User Requirements Manual
SSP 30219	K	Space Station Reference Coordinate Systems Document
SSP 30234	H	Failure Modes and Effects Analysis and Critical Items List Requirements for Space Station
SSP 30237	T January 2012 w/ errata August 2018	Space Station Electromagnetic Emission and Susceptibility Requirements
SSP 30240	H September 2010	Space Station Grounding Requirements
SSP 30242	K December 2011	Space Station Cable/Wire Design and Control Requirements for Electromagnetic Compatibility
SSP 30243	N December 2011	Space Station Requirements for Electromagnetic Compatibility
SSP 30245	P January 2012	Space Station Electrical Bonding Requirements

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Document Number	Document Revision Document Date	Document Title
SSP 30309	F October 2009 w/ errata August 2018	Safety Analysis and Risk Assessment Requirements Document
SSP 30312, Volume I	L	Electrical, Electronic, and Electromechanical (EEE) Parts Management and Implementation Plan for the Space Station Program -
SSP 30423	L	Space Station Approved Electrical, Electronic, and Electromechanical (EEE) Parts List
SSP 30425	B May 1994 w/ errata October 2020	Space Station Program Natural Environment Definition for Design
SSP 30426	D w/ DCN 001 January 1994	Space Station External Contamination Control Requirements
SSP 30482, Volume 1	C July 1997	Electrical Power Specifications and Standards Volume 1: EPS Electrical Performance Specifications
SSP 30512	C June 1994 w/ errata August 2018	Space Station Ionizing Radiation Design Environment
SSP 30558	C August 2001 w/ errata August 2018	Fracture Control Requirements for Space Station
SSP 30559	D February 2008 w/ errata August 2018	Structural Design and Verification Requirements
SSP 30599	F	Safety Review Process
SSP 30695	C	Acceptance Data Package Requirements Specification

PART II – CONTRACT CLAUSES

Document Number	Document Revision Document Date	Document Title
SSP 41167	J March 2016	Mobile Servicing System Segment Specification for the International Space Station Program
SSP 41170	F	Configuration Management Requirements
SSP 41173	D	Space Station Quality Assurance Requirements
SSP 50005	H April 2020	International Space Station Flight Crew Integration Standard (NASA-STD-3000/T)
SSP 50036	C April 2003 w/ errata October 2020	Microgravity Control Plan
SSP 50038	C	Computer-Based Control System Safety Requirements
SSP 50108	G	ISS Program Certification of Flight Readiness Process Document
SSP 50123	E	Configuration Management Handbook
SSP 50175	F	ISS Risk Management Plan
SSP 50190	F	Contingency Action Plan
SSP 50252	T	Operations Data File Standards
SSP 50254	V	Operations Nomenclature (OpNom)
SSP 50290	E May 2007	Prime Item Development Specification for Node 2
SSP 50482	E	ISS Program Software Management Plan
SSP 50502	C	International Space Station Hardware Preflight Imagery Requirements
SSP 50714	G	Data Integration Standards
SSP 50808	G	International Space Station (ISS) to Commercial Orbital Transportation Services (COTS) Interface Requirements Document (IRD)

PART II – CONTRACT CLAUSES

Document Number	Document Revision Document Date	Document Title
SSP 50892	B	Ethernet Requirements for Interoperability with the Joint Station LAN (JSL)
SSP 50902	B	Transportation Integration Office Certification of Flight Readiness Implementation Plan
SSP 50934 Part 1	A January 2014 w/ PIRN 50934-NA-0002 PIRN 50934-NA-0003 PIRN 50934-NA-0005A	Common Communications for Visiting Vehicles (C2V2) Radio Frequency (RF) Interface Control Document (ICD)
SSP 50949	A	International Space Station Configuration Document
SSP 50974	Baseline July 2016	International Space Station Onboard IT Security Requirements for USOS Systems
SSP 51101	Baseline w/ SSCD 16863 and 16887 November 2023	U.S. Deorbit Vehicle Systems Requirements Document
SSP 51105	Baseline April 2024	U.S. Deorbit Vehicle Integration Plan
SSP 51721	Baseline September 2019	ISS Safety Requirements Document
SSP 52051, Volume 1	B September 2013	User Electric Power Specifications and Standards Volume 1: 120 Volt DC Loads
SSQ 21635	R w/ errata August 2018	General Specification for Connectors and Accessories, Electrical, Circular, Miniature, Intravehicular (IVA)/Extravehicular (EVA)/Robot Compatible, Space Quality
SSQ 21652	J March 2019	Wire, Electric, Silicon-Insulated, Nickel-Coated Copper, Space Quality, General Specification for

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Document Number	Document Revision Document Date	Document Title
SSQ 21655	J February 2018	Cable, Electrical, MIL-STD-1553B Notice 2 Data Bus, Space Quality, General Specification for
SSQ 21676	C w/ DCN 001 March 2004	Coupler, Data Bus, MIL-STD-1553B Notice 2, Space Quality, General Specification
SSQ 22680	M February 2018	Connectors, Rectangular, (ORU), Space Quality, General Specification For

PART II – CONTRACT CLAUSES**TABLE ATTACHMENT J-05-02 REFERENCE DOCUMENTS LIST
(RDL)**

Document Number	Document Revision Document Date	Document Title
CCT-STD-1140		Crew Transportation Technical Standards and Design Evaluation Criteria
CPIA Pub 655	1997	Combustion Stability Specifications and Verification Procedures for Liquid Propellant Rocket Engines
EG-ISS-17-003	2017	ISS GNC System Requirements and Performance Characterization for Visiting Vehicles
EID683-98901	C	NDSB1 Engineering Data Package
JSC 08080-2	B September 2015	JSC Design and Procedural Standards
KHB-50009		Space Station Processing Facility Processing and Support Capabilities
NASA/SP-2016-6105	Rev 2 February 2017	NASA Systems Engineering Handbook
NASA/SP-20210023927	Rev D November 2021	NASA Work Breakdown Structure (WBS) Handbook
NASA/TM-2008-215126/Vol I NESC-RP-06-108/05-173-E	April 2008	Design, Development, Test and Evaluation (DDT&E) Considerations for Safe and Reliable Human Rated Spacecraft Systems
NASA-TM-2008-215126 Vol II NESC-RP-06-108 05-173-E Part 2	April 2008	Design, Development, Test and Evaluation (DDT&E) Considerations for Safe and Reliable Human Rated Spacecraft Systems

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Document Number	Document Revision Document Date	Document Title
NPD 7120.4	E	NASA Engineering and Program/Project Management Policy
NPR 7120.5	F w/ Change 1	NASA Space Flight Program and Project Management Requirements
NPR 7120.7	A	NASA Information Technology Program and Project Management Requirements
NPR 7120.8	A w/ Change 2	NASA Research and Technology Program and Project Management Requirements
OCE-52	January 2021	NASA Common Leading Indicators Detailed Reference Guide
SMC-S-025	July 2017	Evaluation And Test Requirements For Liquid Rocket Engines
SSP 50934 ANXA		Common Communications for Visiting Vehicles (C2V2) Radio Frequency (RF) Interface Control Document (ICD), Annex A
SSP 50934 Part 2		Common Communications for Visiting Vehicles (C2V2) Radio Frequency (RF) Interface Control Document (ICD)
	September 2023	ISS Deorbit Concept of Operations
	October 2023	USDV Launch Vehicle Summary

PART IV - REPRESENTATIONS AND INSTRUCTIONS

- Corporate entity (tax-exempt);
- Government entity (Federal, State, or local);
- Foreign Government;
- International organization per 26 CFR 1.6049-4;
- Other

(f) Common parent.

- Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.
- Name and TIN of common parent:
Name
TIN

(End of provision)

K.3 52.204-8 ANNUAL REPRESENTATIONS AND CERTIFICATIONS (FEB 2024)

(a)(1) The North American Industry Classification System (NAICS) code for this acquisition is 336414.

(2) The small business size standard is 1,250 employees.

(3) The small business size standard for a concern that submits an offer, other than on a construction or service acquisition, but proposes to furnish an end item that it did not itself manufacture, process, or produce is 500 employees, or 150 employees for information technology value-added resellers under NAICS code 541519 if the acquisition—

- (i) Is set aside for small business and has a value above the simplified acquisition threshold;
- (ii) Uses the HUBZone price evaluation preference regardless of dollar value, unless the offeror waives the price evaluation preference; or
- (iii) Is an 8(a), HUBZone, service-disabled veteran-owned, economically disadvantaged women-owned, or women-owned small business set-aside or sole-source award regardless of dollar value.

(b)(1) If the provision at 52.204-7, System for Award Management, is included in this solicitation, paragraph (d) of this provision applies.

(2) If the provision at 52.204-7, System for Award Management, is not included in this solicitation, and the Offeror has an active registration in the System for Award Management (SAM), the Offeror may choose to use paragraph (d) of this provision instead of completing the corresponding individual representations and certifications in the solicitation. The Offeror shall indicate which option applies by checking one of the following boxes:

- (i) Paragraph (d) applies.
- (ii) Paragraph (d) does not apply and the offeror has completed the individual representations and certifications in the solicitation.

PART IV - REPRESENTATIONS AND INSTRUCTIONS

(c)(1) The following representations or certifications in SAM are applicable to this solicitation as indicated:

- (i) 52.203-2, Certificate of Independent Price Determination. This provision applies to solicitations when a firm-fixed-price contract or fixed-price contract with economic price adjustment is contemplated, unless -
 - (A) The acquisition is to be made under the simplified acquisition procedures in Part 13;
 - (B) The solicitation is a request for technical proposals under two-step sealed bidding procedures; or
 - (C) The solicitation is for utility services for which rates are set by law or regulation.
- (ii) 52.203-11, Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions. This provision applies to solicitations expected to exceed \$150,000.
- (iii) 52.203-18, Prohibition on Contracting with Entities that Require Certain Internal Confidentiality Agreements or Statements - Representation. This provision applies to all solicitations.
- (iv) 52.204-3, Taxpayer Identification. This provision applies to solicitations that do not include provision at 52.204-7, System for Award Management.
- (v) 52.204-5, Women-Owned Business (Other Than Small Business). This provision applies to solicitations that -
 - (A) Are not set aside for small business concerns;
 - (B) Exceed the simplified acquisition threshold; and
 - (C) Are for contracts that will be performed in the United States or its outlying areas.
- (vi) 52.204-26, Covered Telecommunications Equipment or Services - Representation. This provision applies to all solicitations.
- (vii) 52.209-2, Prohibition on Contracting with Inverted Domestic Corporations - Representation.
- (viii) 52.209-5, Certification Regarding Responsibility Matters. This provision applies to solicitations where the contract value is expected to exceed the simplified acquisition threshold.
- (ix) 52.209-11, Representation by Corporations Regarding Delinquent Tax Liability or a Felony Conviction under any Federal Law. This provision applies to all solicitations.
- (x) 52.214-14, Place of Performance - Sealed Bidding. This provision applies to invitations for bids except those in which the place of performance is specified by the Government.
- (xi) 52.215-6, Place of Performance. This provision applies to solicitations unless the place of performance is specified by the Government.
- (xii) 52.219-1, Small Business Program Representations (Basic, Alternates I, and II). This provision applies to solicitations when the contract is for supplies to be delivered or services to be performed in the United States or its outlying areas, or when the contracting officer has applied part 19 in accordance with 19.000(b)(1)(ii).

PART IV - REPRESENTATIONS AND INSTRUCTIONS

(A) The basic provision applies when the solicitations are issued by other than DoD, NASA, and the Coast Guard.

(B) The provision with its Alternate I applies to solicitations issued by DoD, NASA, or the Coast Guard.

(C) The provision with its Alternate II applies to solicitations that will result in a multiple-award contract with more than one NAICS code assigned.

(xiii) 52.219-2, Equal Low Bids. This provision applies to solicitations when contracting by sealed bidding and the contract is for supplies to be delivered or services to be performed in the United States or its outlying areas, or when the contracting officer has applied part 19 in accordance with 19.000(b)(1)(ii).

(xiv) 52.222-22, Previous Contracts and Compliance Reports. This provision applies to solicitations that include the clause at 52.222-26, Equal Opportunity.

(xv) 52.222-25, Affirmative Action Compliance. This provision applies to solicitations, other than those for construction, when the solicitation includes the clause at 52.222-26, Equal Opportunity.

(xvi) 52.222-38, Compliance with Veterans' Employment Reporting Requirements. This provision applies to solicitations when it is anticipated the contract award will exceed the simplified acquisition threshold and the contract is not for acquisition of commercial products or commercial services.

(xvii) 52.223-1, Biobased Product Certification. This provision applies to solicitations that require the delivery or specify the use of USDA-designated items; or include the clause at 52.223-2, Affirmative Procurement of Biobased Products Under Service and Construction Contracts.

(xviii) 52.223-4, Recovered Material Certification. This provision applies to solicitations that are for, or specify the use of, EPA-designated items.

(xix) 52.223-22, Public Disclosure of Greenhouse Gas Emissions and Reduction Goals - Representation. This provision applies to solicitations that include the clause at 52.204-7.)

(xx) 52.225-2, Buy American Certificate. This provision applies to solicitations containing the clause at 52.225-1.

(xxi) 52.225-4, Buy American - Free Trade Agreements - Israeli Trade Act Certificate. (Basic, Alternates II and III.) This provision applies to solicitations containing the clause at 52.225-3.

(A) If the acquisition value is less than \$50,000, the basic provision applies.

(B) If the acquisition value is \$50,000 or more but is less than \$100,000, the provision with its Alternate II applies.

(C) If the acquisition value is \$100,000 or more but is less than \$102,280, the provision with its Alternate III applies.

(xxii) 52.225-6, Trade Agreements Certificate. This provision applies to solicitations containing the clause at 52.225-5.

(xxiii) 52.225-20, Prohibition on Conducting Restricted Business Operations in Sudan - Certification. This provision applies to all solicitations.

PART IV - REPRESENTATIONS AND INSTRUCTIONS

(xxiv) 52.225-25, Prohibition on Contracting with Entities Engaging in Certain Activities or Transactions Relating to Iran - Representation and Certifications. This provision applies to all solicitations.

(xxv) 52.226-2, Historically Black College or University and Minority Institution Representation. This provision applies to solicitations for research, studies, supplies, or services of the type normally acquired from higher educational institutions.

(2) The following representations or certifications are applicable as indicated by the Contracting Officer:

[Contracting Officer check as appropriate.]

(i) 52.204-17, Ownership or Control of Offeror.

(ii) 52.204-20, Predecessor of Offeror.

(iii) 52.222-18, Certification Regarding Knowledge of Child Labor for Listed End Products.

(iv) 52.222-48, Exemption from Application of the Service Contract Labor Standards to Contracts for Maintenance, Calibration, or Repair of Certain Equipment - Certification.

(v) 52.222-52, Exemption from Application of the Service Contract Labor Standards to Contracts for Certain Services - Certification.

(vi) 52.223-9, with its Alternate I, Estimate of Percentage of Recovered Material Content for EPA-Designated Products (Alternate I only).

(vii) 52.227-6, Royalty Information.

(A) Basic.

(B) Alternate I.

(viii) 52.227-15, Representation of Limited Rights Data and Restricted Computer Software.

(d) The Offeror has completed the annual representations and certifications electronically in SAM accessed through <https://www.sam.gov>. After reviewing the SAM information, the Offeror verifies by submission of the offer that the representations and certifications currently posted electronically that apply to this solicitation as indicated in paragraph (c) of this provision have been entered or updated within the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard applicable to the NAICS code referenced for this solicitation), as of the date of this offer and are incorporated in this offer by reference (see FAR 4.1201); except for the changes identified below **[offeror to insert changes, identifying change by clause number, title, date]**. These amended representation(s) and/or certification(s) are also incorporated in this offer and are current, accurate, and complete as of the date of this offer.

(End of provision)

PART IV - REPRESENTATIONS AND INSTRUCTIONS

(b) Public Laws 112-10, Section 1340(a) and 112-55, Section 536, restrict NASA from contracting to participate, collaborate, or coordinate bilaterally in any way with China or a Chinese-owned company with funds appropriated on or after April 25, 2011. Contracts for commercial and non-developmental items are excepted from the prohibition as they constitute purchase of goods or services that would not involve participation, collaboration, or coordination between the parties.

(c) Representation. By submission of its offer, the offeror represents that the offeror is not China or a Chinese-owned company.

(End of clause)

K.25 52.204-29 FEDERAL ACQUISITION SUPPLY CHAIN SECURITY ACT ORDERS – REPRESENTATION AND DISCLOSURES (DEC 2023)

(a) Definitions. As used in this provision, Covered article, FASCSCA order, Intelligence community, National security system, Reasonable inquiry, Sensitive compartmented information, Sensitive compartmented information system, and Source have the meaning provided in the clause 52.204–30, Federal Acquisition Supply Chain Security Act Orders—Prohibition.

(b) Prohibition. Contractors are prohibited from providing or using as part of the performance of the contract any covered article, or any products or services produced or provided by a source, if the prohibition is set out in an applicable Federal Acquisition Supply Chain Security Act (FASCSCA) order, as described in paragraph (b)(1) of FAR 52.204–30, Federal Acquisition Supply Chain Security Act Orders—Prohibition.

(c) Procedures.

(1) The Offeror shall search for the phrase “FASCSCA order” in the System for Award Management (SAM)(<https://www.sam.gov>) for any covered article, or any products or services produced or provided by a source, if there is an applicable FASCSCA order described in paragraph (b)(1) of FAR 52.204–30, Federal Acquisition Supply Chain Security Act Orders—Prohibition.

(2) The Offeror shall review the solicitation for any FASCSCA orders that are not in SAM, but are effective and do apply to the solicitation and resultant contract (see FAR 4.2303(c)(2)).

(3) FASCSCA orders issued after the date of solicitation do not apply unless added by an amendment to the solicitation.

(d) *Representation.* By submission of this offer, the offeror represents that it has conducted a reasonable inquiry, and that the offeror does not propose to provide or use in response to this solicitation any covered article, or any products or services produced or provided by a source, if the covered article or the source is prohibited by an applicable FASCSCA order in effect on the date the solicitation was issued, except as waived by the solicitation, or as disclosed in

PART IV - REPRESENTATIONS AND INSTRUCTIONS

paragraph (e).

(e) *Disclosures.* The purpose for this disclosure is so the Government may decide whether to issue a waiver. For any covered article, or any products or services produced or provided by a source, if the covered article or the source is subject to an applicable FASCSA order, and the Offeror is unable to represent compliance, then the Offeror shall provide the following information as part of the offer:

- (1) Name of the product or service provided to the Government;
- (2) Name of the covered article or source subject to a FASCSA order;
- (3) If applicable, name of the vendor, including the Commercial and Government Entity code and unique entity identifier (if known), that supplied the covered article or the product or service to the Offeror;
- (4) Brand;
- (5) Model number (original equipment manufacturer number, manufacturer part number, or wholesaler number);
- (6) Item description;
- (7) Reason why the applicable covered article or the product or service is being provided or used;

(f) *Executive agency review of disclosures.* The contracting officer will review disclosures provided in paragraph (e) to determine if any waiver may be sought. A contracting officer may choose not to pursue a waiver for covered articles or sources otherwise subject to a FASCSA order and may instead make an award to an offeror that does not require a waiver.

(End of provision)

[END OF SECTION]

PART IV - REPRESENTATIONS AND INSTRUCTIONS

- iii. Their total shall not exceed 90 percent of the contract price if on a whole contract basis, or 90 percent of the delivery item price if on a delivery item basis.
 - 3. The terms and conditions of the performance-based financing must be in the best interests of the Government.
- (d) The offeror's proposal of performance-based payment financing shall include the following:
- 1. The proposed contractual language describing the performance-based payments (see FAR 32.1004 for appropriate criteria for establishing performance bases and performance-based finance payment amounts).
 - 2. A listing of-
 - i. The projected performance-based payment dates and the projected payment amounts; and
 - ii. The projected delivery date and the projected payment amount.
 - 3. Information addressing the Contractor's investment in the contract.
- (e) Evaluation of the offeror's proposed prices and financing terms will include whether the offeror's proposed performance-based payment events and payment amounts are reasonable and consistent with all other terms and conditions of the offeror's proposal.

(End of Provision)

L.7 FAR 52.233-2 SERVICE OF PROTEST (SEP 2006)

Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the Government Accountability Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from

NASA Lyndon B. Johnson Space Center

BG/Audrey Montgomery

Email: [REDACTED] and [REDACTED]

The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of Provision)

L.8 FAR 52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will

PART IV - REPRESENTATIONS AND INSTRUCTIONS

(End of Provision)

L.19 JSC 52.215-123 AVAILABILITY OF SPECIFICATIONS (DEC 2019) (JSC PROCUREMENT INSTRUCTION)

- (a) For the purpose of this RFP, the Technical Reference Library contains the official versions of applicable and reference documentation. No other version of the documentation should be used.
- (b) All non-copyrighted technical documentation which is incorporated directly by reference in this solicitation may be obtained online from the Government wide point of entry (GPE) USDV Attachments/Links section. The USDV acquisition website at <https://www.nasa.gov/jsc/procurement/usdv> includes a link to the post at the GPE.
- (c) All copy-righted technical documentation which is incorporated directly by reference in this solicitation cannot be placed on the USDV Technical Reference Library. If the Offeror desires to have these copy-righted documents to prepare their proposal they must be obtained, at the bidder's expense, from the organization that develops, establishes and/or publishes those documents.
- (d) Upon request, the Contracting Officer will furnish to the Offeror NASA technical documents not incorporated by reference.

(End of Provision)

L.20 JSC 52.215-124 COMMUNICATIONS REGARDING THIS SOLICITATION (MAR 2023) (JSC PROCUREMENT INSTRUCTION)

- (a) Any communications in reference to this solicitation shall cite the solicitation number and be directed to the Contracting Officer:

Name: Audrey Montgomery

Email: [REDACTED] and [REDACTED]

- (b) **QUESTIONS REGARDING THIS SOLICITATION MUST BE PRESENTED IN WRITING** and shall be submitted electronically to the above e-mail address by 1:30 p.m. (Central) on **January 5, 2024** in order that answers may be obtained and disseminated in a timely manner, since it is not expected that the proposal submission date will be extended. Oral communications are not acceptable in response to this solicitation. Questions shall not be directed to the technical activity personnel.

(End of Provision)

PART IV - REPRESENTATIONS AND INSTRUCTIONS**L.23 INTRODUCTION**

The proposal volumes shall fully demonstrate that the Offeror understands and can successfully perform the requirements of the solicitation. The Offeror's proposed approach to Mission Suitability and Cost / Price should be specific, detailed, and contain sufficient information to clearly and fully demonstrate the Offeror's understanding of the requirements and the inherent risks associated with the objective of this procurement. Stating that the Offeror understands and shall comply with the requirements or paraphrasing the requirements is inadequate, as are phrases such as "Standard procedures shall be employed" and "Well-known techniques shall be used". The Offeror shall provide an assessment of the risks associated with the proposed approach, including the identification of impacts and mitigation recommendations in the appropriate Mission Suitability proposal volume. Information previously submitted, if any, shall be considered only to the extent it is resubmitted; it should not be incorporated by reference.

L.24 PROPOSAL ARRANGEMENT, PAGE LIMITATIONS, COPIES, AND DUE DATES

(a) Proposal Volume III, Past Performance, is due by **2/9/2024** at 1:30 p.m. Central Time.

Proposal Volumes I, II, IV and V is due by **3/4/2024** at 1:30 p.m. Central Time.

The delivery location is specified in:

L.18 Electronic Submission of Proposals – Proposal Marking and Delivery Through NASA's EFSS Box (NOV 2021)

(b) Offerors shall arrange their proposals as set forth below in Table L-24-1 Overview of Proposal Volumes, Page Limitations, Copies, and Format. Proposal sections excluded from the page limit shall be placed at the end of each volume.

(c) Final proposal revisions are due by 5/14/2024 at 1:30 p.m. Central Daylight Time.

PART IV - REPRESENTATIONS AND INSTRUCTIONS

TABLE L24-1: OVERVIEW OF PROPOSAL VOLUMES, PAGE LIMITATIONS, COPIES, AND FORMAT

Volume No.	Title	Page Limit	Electronic Copy	Format	Offeror Numbering Nomenclature	Page Number
I	Cost and Price Factor					
	Cost and Price Narrative	None	X	MS Word	OFI	OFI
	Templates	None	X	MS Excel	OFI	OFI
II	Mission Suitability Factor	240*				
	TA1 Specific Technical Understanding and Resources Includes all information required by provision L.27.1, including CLIN 2A, Representative Task Order, and Representative Delivery Order narratives	Included in the 240	X	MS Word	OFI	OFI
	TA1 Specific Technical Understanding and Resources: Representative Task Order and Representative Delivery with all OFIs filled in and section titled 'Instructions for Task/Delivery Order Proposal' removed	None	X	MS Word	OFI	OFI
	TA1 L-02 BOEs and L-03 Technical Resource Template (TRT)	No page limit	X	MS Word MS Excel	OFI	OFI
	TA1 Integrated Master Schedules (IMS), in accordance with the Integrated Program Management Data Analysis Review (IPMDAR) (DRD USDV-7)	No page limit	X	PDF and Microsoft Project	OFI	OFI

PART IV - REPRESENTATIONS AND INSTRUCTIONS

Volume No.	Title	Page Limit	Electronic Copy	Format	Offeror Numbering Nomenclature	Page Number
	TA1 Summary Master Schedule, Native Schedule File Data Dictionary and Schedule Assumptions in accordance with the Integrated Program Management Data Analysis Review (IPMDAR) (DRD USDV-7)	No page limit	X	PDF	OFI	OFI
	TA1 Schedule Risk Assessment in accordance with the Integrated Program Management Data Analysis Review (IPMDAR) (DRD USDV-7)	No page limit	X	PDF	OFI	OFI
	TA1 Standard Labor Categories in accordance with Attachment L-05 Standard Labor Categories	No page limit	X	MS Word	OFI	OFI
	TA1 Work Breakdown Structure (WBS) and WBS Dictionary in accordance with Work Breakdown Structure (WBS) and WBS Dictionary (DRD USDV-6)	No page limit	X	MS Word	OFI	OFI
	TA2 USDV System Architecture – paragraphs a -f, which includes Concept of Operations (DRD USDV-4)	Included in the 240	X	MS Word	OFI	OFI
	TA3 Design, Development, Test, and Evaluation (DDT&E) (DRD USDV-25) – paragraph a – j only	Included in the 240	X	MS Word	OFI	OFI
	TA3 Qualification and Acceptance Plan (DRD USDV-44) paragraph a only	Included in the 240	X	MS Word	OFI	OFI
	TA3 TRL Assessment and Technology Maturation Plan (DRD USDV-23) – submit DRD in full	Included in the 240	X	MS Word	OFI	OFI
	TA3 Propulsion System Development Approach	Included in the 240	X	MS Word	OFI	OFI

PART IV - REPRESENTATIONS AND INSTRUCTIONS

Volume No.	Title	Page Limit	Electronic Copy	Format	Offeror Numbering Nomenclature	Page Number
	TA.4 NASA Standards and Specifications Compliance and Tailoring Approach (DRD USDV-33) –items a - e	Included in the 240	X	MS Word	OFI	OFI
	TA.5 Safety & Mission Assurance (S&MA) Plan (DRD USDV-20) –Volume 1 only	No page limit for Volume 1	X	MS Word	OFI	OFI
	TA.5 Safety & Mission Assurance Plan (S&MA) narrative (paragraphs b and c)	Narrative is included in the 240	X	MS Word	OFI	OFI
	MA1 Program Management Plan (DRD USDV-1) Paragraphs a through p only	Included in the 240	X	MS Word	OFI	OFI
	MA2 Insight Management Plan (DRD USDV-5)	Included in the 240	X	MS Word	OFI	OFI
	MA3 Attachment J-30 Work Plans (Parts A and B)	No page limit	X	MS Word	OFI	OFI
	MA3 Project Life-Cycle Review Plan and Data Packages (DRD USDV-3) Paragraph a only	Included in the 240	X	MS Word	OFI	OFI
	Small Business Utilization – Attachment J- 11 SBU1 Small Business Subcontracting Small Business Subcontracting Plan (DRD USDV-11)	Unlimited	X	MS Word	OFI	OFI
	SBU2 Commitment to Small Business Program	10	X	MS Word	OFI	OFI
	L-08 – Government Task Agreements	None	X	PDF	OFI	OFI
III	Past Performance					

PART IV - REPRESENTATIONS AND INSTRUCTIONS

Volume No.	Title	Page Limit	Electronic Copy	Format	Offeror Numbering Nomenclature	Page Number
	Past Performance Description	15	X	MS Word	OFI	OFI
	Past Performance Environmental and Safety Data, Insurance Information, PP Attachments, and Organizational Chart	None	X	MS Word or Native Format	OFI	OFI
	L-06 Past Performance Consent Letters	None	X	PDF	OFI	OFI
	L-07 Past Performance Information (Matrix)	None	X	MS Excel	OFI	OFI
IV	Responsibility Considerations					
	Organizational Conflict of Interest (OCI) Plan (DRD USDV-10)	None	X	MS Word	OFI	OFI
	FAR 16.301-3, Cost-Reimbursable Contracts, Limitations	None	X	MS Word	OFI	OFI
	L-09 Pre-award Survey of Prospective Contractor Accounting System Checklist (<i>Applies to CPIF only</i>) (required only if a determination of adequacy of Offeror's accounting system has not been made by the Government (normally DCAA))	None	X	PDF	OFI	OFI
	Company Information	None	X	MS Word	OFI	OFI
	Prime/Subcontractor Identification and SOW Division of Work Listing	None	X	MS Excel	OFI	OFI
	Subcontracting Arrangement Information (if required)	None	X	MS Word	OFI	OFI
	SAE AS9100, Quality Management Systems – Requirements for Aviation, Space and Defense Organizations Certification	None	X	PDF	OFI	OFI

PART IV - REPRESENTATIONS AND INSTRUCTIONS

Volume No.	Title	Page Limit	Electronic Copy	Format	Offeror Numbering Nomenclature	Page Number
	Financial Capability Information	None	X	MS Word	OFI	OFI
	Launch Vehicle Compatibility	None	X	MS Word	OFI	OFI
	Indemnification Under Public Law 85-804 Request	None	X	PDF	OFI	OFI
	Business System Adequacy*	None	X	MS Word	OFI	OFI
	Cost Accounting Standards*	None	X	MS Word	OFI	OFI
	Export Control Plan *	None	X	MS Word	OFI	OFI
	Government Property Management Plan*	None	X	MS Word	OFI	OFI
	Taxpayer Identification Number*	None	X	MS Word	OFI	OFI
	Waiver of Rights for Invention*	None	X	MS Word	OFI	OFI
	Information Technology (IT) Systems Information*	None	X	MS Word	OFI	OFI
	Any additional responsibility information	None	X	MS Word	OFI	OFI
V	Model Contract**					

* Submit upon CO request with Final Proposal Revision (FPR) or from the Apparent Awardee (if no discussions are necessary)

** All Offerors are required to submit the entire Model Contract inclusive of every Section A-J also to include all requested fill-ins. Offerors shall also submit Section K, Representations and Certifications, with all fill-ins completed. Sections L and M are not to be included as part of the Model Contract. Offerors shall not insert company logos or additional header and footer information into the Model Contract files that are not part of the solicitation.

(d) All proposal volumes must be self-contained and not incorporate proposal information by reference, to include links to websites or other information available on the internet.

(e) Model Contract deletions or revisions differing from the requirements set forth in the solicitation will not be considered for award.

(End of Provision)

PART IV - REPRESENTATIONS AND INSTRUCTIONS

Contract Section	Areas of Model Contract Offerors are Required to Complete
	<p>(to be proposed)</p> <ul style="list-style-type: none"> • Attachment J-30 Work Plans (fill in all OFIs, and to be proposed Parts A and B) • Attachment J-32 Standard Labor Categories (to be proposed) • Attachment J-33 Government-Furnished Property, Facilities, and Data/Information (Fill in all OFIs) • Attachment J-34 Installation Accountable Government Property • Attachment J-37 Incentive Fee Plan (<i>Applies to CPIF only</i>)(fill in all OFIs) • Attachment J-39 Propulsion System Development Approach (to be proposed) • Attachment J-40 Deliverable Items List (fill in all OFIs)
Section K	All representations and certifications shall be completed electronically and submitted with this volume in accordance with provisions in Section K.

(End of provision)

L.31 FAR 52.201-1 Acquisition 360: Voluntary Survey (Sep 2023)

(a) All actual and potential offerors are encouraged to provide feedback on the preaward and debriefing processes, as applicable. Feedback may be provided to agencies up to 45 days after award. The feedback is anonymous, unless the participant self-identifies in the survey. Actual and potential offerors can participate in the survey by selecting the following link: <https://www.acquisition.gov/360>.

(b) The Contracting Officer will not review the information provided until after contract award and will not consider it in the award decision. The survey is voluntary and does not convey any protections, rights, or grounds for protest. It creates a way for actual and potential offerors to provide the Government constructive feedback about the preaward and debriefing processes, as applicable, used for a specific acquisition.

(End of provision)

(End of Section)

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PART I – THE SCHEDULE**SECTION B – SUPPLIES OR SERVICES AND PRICES/COSTS****B.1 CONTRACT TYPE**

The USDV contract is a Single-award Firm Fixed Price core with Indefinite Delivery Indefinite Quantity (IDIQ) Firm Fixed Price (FFP) task orders. *(Applicable if proposing FFP CLIN 1 and FFP CLIN 2)*

(End of clause)

B.2 SUPPLIES AND/OR SERVICES TO BE PROVIDED / ITEMS ISSUED

The Contractor shall provide all services, facilities and resources necessary to furnish the Contract Line Item Numbers (CLINs) in accordance with the following table and per Section C, Description/Specifications/Performance Work Statement; all task orders issued, Section J, Attachment J-01 *Data Requirements Descriptions*; and all other requirements specified throughout the core contract and authorized task orders, except for resources provided by the Government under Clause G.5 NFS 1852.245-76, LIST OF GOVERNMENT FURNISHED PROPERTY FURNISHED PURSUANT TO FAR 52.245-1, GOVERNMENT PROPERTY.

Table B.2: SUPPLIES AND/OR SERVICES TO BE PROVIDED AND TOTAL AMOUNT

CLIN	CLIN Category	Contract Type	Title	Price
1	Core	FFP	Design, Development, Test and Evaluation (DDT&E) Through Critical Design Review (CDR)	(b) (4)
2	Core	FFP	Production, Assembly, Integration and Test	
2A	Option		Critical Spares	
3	IDIQ	FFP	Dwell	
4	IDIQ	FFP	Launch Vehicle (LV) Integration and Sustaining	
5	IDIQ	FFP	Special Tasks and Studies	
	Total			\$498,635,258.77

(End of clause)

PART I – THE SCHEDULE

**B.3 CLIN 1 DESIGN, DEVELOPMENT, TEST AND EVALUATION (DDT&E)
THROUGH CRITICAL DESIGN REVIEW (CDR) (CORE)**

The CLIN 1 Core firm fixed price of this contract is (b) (4)

(End of clause)

B.4 CLIN 2 PRODUCTION, ASSEMBLY, INTEGRATION AND TEST (CORE)

The CLIN 2 Core firm fixed price of this contract is (b) (4)

Price for CLIN 2 Core is valid for up to one year beyond the proposed CLIN 2 Core Authority to Proceed (ATP) date.

The CLIN 2A Critical Spares firm fixed price option of this contract is

(End of clause)

PART I – THE SCHEDULE**B.5 CLIN 3 DWELL (IDIQ)**

CLIN 3 scope (SOW Section 5.0 *Dwell (CLIN 3)*) includes storing the USDV in the Dwell facility prior to shipment to the Launch Site Payload Processing Facility (PPF) and reporting on the Dwell status at the quarterly Program Management Review.

TABLE B.5: CLIN 3 DWELL PRICING

Pricing Element	GFY 2028	GFY 2029	GFY 2030	GFY 2031
	10/1/2027- 9/30/2028	10/1/2028- 9/30/2029	10/1/2029- 9/30/2030	10/1/2030- 3/31/2031
Dwelling Price Per Quarter Year	(b) (4)			

Pricing Element	GFY 2031 Option Period 1	GFY 2032 Option Period 2	GFY 2033 Option Period 3	GFY2034 Option Period 4	GFY 2035 Option Period 5
	4/1/2031- 9/30/2031	10/1/2031- 9/30/2032	10/1/2032- 9/30/2033	10/1/2033- 9/30/2034	10/1/2034- 9/30/2035
Dwelling Price Per Quarter Year	(b) (4)				

(End of clause)

B.6 CLIN 4 LAUNCH VEHICLE (LV) INTEGRATION AND SUSTAINING (IDIQ)

CLIN 4 includes scope for LV integration and sustaining engineering and operations including final LV integration and testing, pre-launch preparation, flight execution preparation, launch and flight operations, and procurement of hardware.

The rates in the clause are per hour Fully Burdened Labor Rates inclusive of profit. The purpose of this clause is to set forth the rates to be utilized in the subsequent negotiation of FFP IDIQ orders in accordance with clause NFS 1852.216-80, Task Ordering Procedure. At the bottom of the table there is a row(s) that allows indirect rates to be applied to any non-labor resources, as required by task order, if applicable. Pricing of all FFP IDIQ orders shall be in accordance with the negotiated rates set forth below.

PART I – THE SCHEDULE

TABLE B.6: CLIN 4 LAUNCH VEHICLE (LV) INTEGRATION AND SUSTAINING PRICING (\$/HR)

Pricing Elements	GFY 2024	GFY 2025	GFY 2026	GFY 2027	GFY 2028	GFY 2029	GFY 2030	GFY 2031
	06/25/2024-9/30/2024	10/1/2024-9/30/2025	10/1/2025-9/30/2026	10/1/2026-9/30/2027	10/1/2027-9/30/2028	10/1/2028-9/30/2029	10/1/2029-9/30/2030	10/1/2030-3/31/2031
Program Manager	(b) (6)							
Engineer								
Technician								
Business								
Administrative								
Non-Labor Resources (%) Maximum percentage								

Pricing Elements	GFY 2031 Option Period 1	GFY 2032 Option Period 2	GFY 2033 Option Period 3	GFY 2034 Option Period 4	GFY 2035 Option Period 5
	4/1/2031-9/30/2031	10/1/2031-9/30/2032	10/1/2032-9/30/2033	10/1/2033-9/30/2034	10/1/2034-9/30/2035
Program Manager	(b) (4)				
Engineer					
Technician					
Business					
Administrative					
Non-Labor Resources (%) Maximum percentage					

(End of clause)

PART I – THE SCHEDULE

B.7 CLIN 5 SPECIAL TASKS AND STUDIES (IDIQ)

The overall Objective of CLIN 5 is the performance of special tasks and studies necessary to perform activities that may be requested by NASA.

The Contractor shall perform special studies and analyses, risk reduction activities, provide materials, and/or fabricate incidental hardware in support of this contract, as required. Each task will be initiated by written direction from the NASA Contracting Officer (CO). These tasks include advance planning and feasibility studies in support of future contemplated requirements; development, fabrication, and test of hardware/software to support planning studies or special tests, mission unique studies, material provision, and implementation of changes required due to changes in requirements.

B.7.1 SUBCLIN 5A SPECIAL TASKS AND STUDIES (\$/HR or %)

Pricing Elements Technical/Admin	GFY 2024	GFY 2025	GFY 2026	GFY 2027	GFY 2028	GFY 2029	GFY 2030	GFY 2031
	<i>06/25/2024- 9/30/2024</i>	<i>10/1/2024- 9/30/2025-</i>	<i>10/1/2025- 9/30/2026</i>	<i>10/1/2026- 9/30/2027</i>	<i>10/1/2027- 9/30/2028</i>	<i>10/1/2028- 9/30/2029</i>	<i>10/1/2029- 9/30/2030</i>	<i>10/1/2030- 3/31/2031</i>
Level 1 (90/10)	(b) (4)							
Level 2 (75/25)								
Level 3 (50/50)								
Level 4 (25/75)								
Non-Labor Resources (%) Maximum percentage								

Pricing Elements Technical/Admin	GFY 2031 Option Period 1	GFY 2032 Option Period 2	GFY 2033 Option Period 3	GFY 2034 Option Period 4	GFY 2034 Option Period 5
	<i>4/1/2031- 9/30/2031</i>	<i>10/1/2031- 9/30/2032</i>	<i>10/1/2032- 9/30/2033</i>	<i>10/1/2033- 9/30/2034</i>	<i>10/1/2034- 9/30/2035</i>
Level 1 (90/10)	(b) (4)				
Level 2 (75/25)					
Level 3 (50/50)					
Level 4 (25/75)					
Non-Labor Resources (%) Maximum percentage					

PART I – THE SCHEDULE

B.7.2 SUBCLIN 5B SPECIAL TASKS AND STUDIES (\$)

Pricing Elements	GFY 2024	GFY 2025	GFY 2026	GFY 2027	GFY 2028	GFY 2029	GFY 2030	GFY 2031
	06/25/2024-9/30/2024	10/1/2024-9/30/2025	10/1/2025-9/30/2026	10/1/2026-9/30/2027	10/1/2027-9/30/2028	10/1/2028-9/30/2029	10/1/2029-9/30/2030	10/1/2030-3/31/2031
Tier I (125 hrs.)	(b) (4)							
Tier II (250 hrs.)								
Tier III (500 hrs.)								
Tier IV (750 hrs.)								
Tier V (1000 hrs.)								

Pricing Elements	GFY 2031 Option Period 1	GFY 2032 Option Period 2	GFY 2033 Option Period 3	GFY 2034 Option Period 4	GFY 2034 Option Period 5
	4/1/2031-9/30/2031	10/1/2032-9/30/2033	10/1/2032-9/30/2033	10/1/2033-9/30/2034	10/1/2034-9/30/2035
Tier I (125 hrs.)	(b) (4)				
Tier II (250 hrs.)					
Tier III (500 hrs.)					
Tier IV (750 hrs.)					
Tier V (1000 hrs.)					

(End of clause)

B.8 RESERVED

PART I – THE SCHEDULE

**B.9 JSC PROCUREMENT INSTRUCTION (JPI) 52.216-90 IDIQ MINIMUM AND
MAXIMUM ORDERING LIMITS (NOV 2018)**

In accordance with FAR 52.216-22, Indefinite Quantity, the contract guaranteed minimum amount* to be ordered under this contract is \$100,000 and the contract Not to Exceed (NTE) amount* which may be ordered under this contract is \$302,000,000. The Government is not obligated to order more than the minimum specified, but may order up to the NTE amount. The Contractor is obligated to fulfill orders issued, up to the NTE amount within the limits specified in FAR 52.216-19 *Order Limitations*.

* These values are based on “dollars”.

(End of clause)

[END OF SECTION]

PART I – THE SCHEDULE

SECTION C - DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK

**PART I – THE SCHEDULE
STATEMENT OF WORK
FOR THE INTERNATIONAL SPACE STATION
UNITED STATES DEORBIT VEHICLE**

1.0 INTRODUCTION

1.1 OVERVIEW AND OBJECTIVES

The primary objective of this contract is to procure a safe, reliable, and cost-effective deorbit vehicle to meet NASA's International Space Station (ISS) end-of-life deorbit mission requirements. This will require the Contractor to design, develop, manufacture, test, integrate, achieve NASA acceptance, deliver, and sustain its United States Deorbit Vehicle (USDV) such that the USDV can perform the final deorbit of the ISS.

1.2 SCOPE

This Statement of Work (SOW) and all applicable documents clauses, and Data Requirements Documents (DRDs) referenced herein define the requirements for the Contractor to meet NASA and Government safety, functional, performance, and interface requirements, deliver to NASA, and sustain the USDV. This includes but is not limited to the scope for completion of the design, development, test, evaluation, production, assembly, integration, acceptance, delivery, and sustaining of a USDV capable of free flight, rendezvous, and docking with the ISS. The USDV shall perform ISS attitude control, ISS translational maneuvers, and the final ISS orbit shaping and reentry burns, while meeting all mission objectives as specified in this contract. The USDV contractor shall plan and perform all activities required to integrate the USDV with the launch vehicle (LV). The USDV contractor shall provide sustaining engineering from NASA acceptance through the end of mission operations. In addition, the Contractor shall provide special tasks and studies to the extent ordered under Contract Line Item (CLIN) 5, *Special Tasks and Studies – Fixed Price* of this contract.

The Contractor shall provide all the necessary management, personnel, facilities, equipment, materials, and supplies to deliver the products and services defined in this SOW. Government Task Agreements (GTAs) are available for selected functions to meet this intent in accordance with the Contract.

The scope of CLIN 1 *Design, Development, Test and Evaluation (DDT&E) Through Critical Design Review* includes both SOW Section 3.0 *Overall General Requirements* and the required elements of SOW Section 2.0, *Overall General Requirements* to perform the CLIN 1 activities. The scope of CLIN1 will concludes when Review Item Discrepancy/Request for Action (RID/RFAs) from CDR and previous reviews are jointly dispositioned and forward actions are jointly identified and agreed to.

The scope of CLIN 2, *Production, Assembly, Integration and Test* includes both SOW Section 4.0 *Production, Assembly, Integration and Test (CLIN 2)* and the required elements of SOW Section 2.0, *Overall General Requirements* to perform the CLIN 2 activities, completion of the design, and includes the completion of forward actions identified in CLIN 1. The scope of CLIN 2 includes acceptance and delivery of the full USDV design and hardware/software, including final assembly, integration, and test performed during Dwell that supports the Government's L-12 month call up for launch. The scope of CLIN 2 will conclude following completion of Milestone C2-4 System Acceptance and Milestone C2-5 Shipment to Acceptance Destination, including completion of System Acceptance Review (SAR), the shipment of the USDV System

PART I – THE SCHEDULE

to the Acceptance Destination, and corrective actions and mitigations to address issues identified during shipment have been completed.

The scope of CLIN3, *Dwell*, includes both SOW Section 5.0 *Dwell (CLIN 3)* and the required elements of SOW Section 2.0 *General Requirements* to perform the CLIN3 activities while the USDV is in Dwell. Any final assembly, integration, and test in support of the USDV acceptance and delivery performed during Dwell to support the L-12 month call up for launch will be included in CLIN 2, not CLIN 3. The scope of CLIN3 will conclude following completing of the final Dwell Release Review (DRR) and corrective actions and mitigations to address issues identified during dwell have been completed.

The scope of CLIN4, *Launch Vehicle Integration and Sustaining* includes both SOW Section 6.0 *Launch Vehicle Integration and Sustaining (CLIN4)* and the required elements of SOW Section 2.0 *Overall General Requirements* to perform the CLIN4 Launch Vehicle Integration and Sustaining activities. The scope of CLIN4 will conclude following the completion of the USDV mission and USDV contract closeout activities.

The scope of CLIN5, *Special Tasks and Studies* includes both SOW Section 7.0 *Special Tasks and Studies (CLIN 5)* and the required elements of SOW Section 2.0 *Overall General Requirements* to perform the CLIN5 activities through the duration of the USDV contract. The scope of CLIN5 will conclude following the completion of the USDV mission and USDV contract closeout activities.

Due to the nature of the USDV contract, the Contractor shall ensure that no tasks performed under one CLIN be replicated, re-performed, or duplicated under another CLIN.

1.3 SOW ORGANIZATION AND STRUCTURE

This SOW is organized to align with five CLINs:

SOW Section #	Title	CLIN
1.0	Introduction	Applicable to all CLINs
2.0	Overall General Requirements	Applicable to all CLINs
3.0	Design, Development, Test and Evaluation (DDT&E) Through Critical Design Review (CDR)	CLIN 1
4.0	Production, Assembly, Integration and Test	CLIN 2
5.0	Dwell	CLIN 3
6.0	Launch Vehicle (LV) Integration and Sustaining	CLIN 4
7.0	Special Tasks and Studies	CLIN 5

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- a. The Performance of the work under this contract is subject to the written technical direction of the NASA Contracting Officer's Representative (COR), who will be specifically appointed by the NASA Contracting Officer (CO) in writing. "Technical direction" means a directive to the Contractor that approves approaches, solutions, designs, or refinements; fills in details or otherwise completes the general description of work or documentation items; shifts emphasis among work areas or tasks; or furnishes similar instruction to the Contractor. Technical direction includes requiring studies and pursuit of certain lines of inquiry regarding matters within the general tasks and requirements in the contract SOW. All technical direction shall be issued in writing by the COR.
- b. The COR does not have the authority to, and shall not, issue any instruction purporting to be technical direction that composes of the following:
 1. Constitutes an assignment of additional work outside the SOW
 2. Constitutes a change as defined in the "Changes" clause (contract Section I)
 3. Constitutes a basis for any increase or decrease in the total estimated contract cost, the fixed fee (if any), or the time required for contract performance
 4. Changes any of the expressed terms, conditions, or specifications of the contract
 5. Interferes with the Contractor's rights to perform the terms and conditions of the contract
- c. The Contractor shall proceed promptly with the performance of the technical direction duly issued by the COR in the manner prescribed above and within the COR's authority. If, in the Contractor's opinion, any instruction or direction by the COR falls within any of the categories defined above, the Contractor shall not proceed, but shall notify the CO in writing within fourteen (14) calendar days after receiving it. Additionally, the Contractor shall request the CO to either issue an appropriate contract modification within a reasonable time or advise the Contractor in writing within thirty (30) calendar days that the instruction or direction is rescinded in its entirety or respond that the technical direction is within the requirements of the contract and does not constitute a change under the "Changes" clause of the contract, and that the Contractor should proceed promptly with its performance.
- d. A failure of the Contractor and CO to agree that the instruction or direction is both within the requirements of the contract and does not constitute a change under the "Changes" clause, or a failure to agree upon the contract action to be taken with respect to the instruction or direction, shall be subject to the Disputes clause of this contract.
- e. Any action(s) taken by the Contractor in response to any direction given by any person other than the CO or the COR shall be at the Contractor's risk.

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2.0 OVERALL GENERAL REQUIREMENTS

Section 2 provides the scope of the work applicable to all CLINs and associated tasks required to manage and lead the USDV contract.

- a. The Contractor shall design, develop, deliver, and sustain the USDV to meet the requirements in SSP 51101, *USDV Systems Requirements Document (SRD)*.
- b. NASA will provide a Medium or High Performance Launch Vehicle (LV).
- c. The Contractor shall maintain readiness of the USDV including support personnel, equipment, software, and facilities to support the planned launch date with 12 months of notification from NASA.

2.1 PROGRAM MANAGEMENT

- a. The Contractor shall perform all program management functions required to provide the full scope of the USDV contract.
- b. The Contractor shall flow down applicable requirements to all subcontractors, vendors, and teaming partners.
- c. The Contractor shall provide all resources, tools, facilities, processes, and functions required to meet the requirements on this contract.
- d. The Contractor shall provide NASA insight into all technical and programmatic activities performed under this contract.
- e. The Contractor shall develop, implement, maintain, deliver, and operate in accordance with a Program Management Plan (PMP) per *Program Management Plan (DRD USDV-1)*.
- f. The Contractor shall develop, maintain, and implement a process to verify flight certification and readiness in accordance with SSP 50108, *ISS Program Certification of Flight Readiness Process Document*. The Contractor's auditable approach shall verify that all flight preparation responsibilities and requirements have been met and that all problems have been dispositioned. The Contractor shall provide objective evidence required to certify Contractor readiness for NASA certification of flight readiness.
- g. The Contractor shall provide the USDV Contractor Certification of Flight Readiness (CoFR) endorsements in accordance with SSP 50108, *ISS Program Certification of Flight Readiness Process Document*, and SSP 50902, *Transportation Integration Office Certification of Flight Readiness Implementation Plan*. The Contractor shall provide technical and programmatic inputs and subject matter expertise to address issues and concerns at the Stage Operations Readiness Review (SORR), Flight Readiness Review (FRR), and Launch Readiness Review (LRR), including any pre-board meetings and activities.
- h. The Contractor shall apply all Applicable documents and standards identified in Attachment J-05, *Applicable and Reference Documents List*.

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- i. The Contractor shall meet all applicable local, national, and international laws and regulations during contract performance. The Contractor shall be responsible for obtaining and maintaining all applicable licenses, permits, and agreements required to deliver the USDV contract.
- j. The Contractor shall perform activities and implement internal processes that meet the contract requirements and Applicable Document List in order to conduct reviews, provide products, and provide verifications to confirm the USDV System is being implemented in a manner that satisfies the contract requirements including the USDV responsibilities documented in SSP 51105, *U.S. Deorbit Vehicle Integration Plan*.
- k. The Contractor shall be responsible for safe transportation of the USDV, flight hardware, and ground hardware in accordance with the *USDV Transportation and Logistics Requirements Plan (DRD USDV-29)*.
- l. The Contractor shall manage NASA-Owned/Contractor-Held records in accordance with Title 36 of the Code of Federal Regulations, Chapter XII B, Records Management, and NPD 1440.6, *NASA Records Management*. The records shall be organized in accordance with the instructions in NPR 1441.1, *NASA Records Management Program Requirements*, and NRRS 1441.1, *NASA Records Retention Schedule*, as applicable. The contractor shall disposition records and non-records in accordance with NPR 1441.1, *NASA Records Retention Schedule*, which has been approved by NASA and the National Archives and Records Administration. All questions on records management issues shall be directed through the CO to the ISS Records Liaison Officer.
- m. The Contractor shall maintain a records management program for all data/records produced as part of this contract and submit a plan to analyze, manage, administer, and disposition Government owned and Contractor managed data in accordance with *Program Management Plan (DRD USDV-1)*. The Contractor shall verify and validate their data and records management system through the Contractor's internal audit process.
- n. The Contractor shall perform contract close-out in accordance with *Program Management Plan (DRD USDV-1)*.

2.1.1 PROGRAM MANAGEMENT REVIEW (PMR)

The quarterly PMRs provide NASA with insight into the Contractor's, subcontractor's, and vendors' performance. The PMR provides NASA management an overall program status on technical, cost, and schedule performance.

- a. The Contractor shall conduct quarterly PMRs for NASA and provide review products in accordance with *Program Management Review (PMR) (DRD USDV-2)*.

2.2 BUSINESS MANAGEMENT

2.2.1 SCHEDULING

The Contractor shall develop, implement, maintain, deliver, report, and operate in compliance with the Integrated Master Schedule (IMS) in accordance with *Integrated Program Management Data Analysis Review (IPMDAR) (DRD USDV-7)*.

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2.2.2 RESOURCE MANAGEMENT

- a. The Contractor shall establish, maintain, and use in the performance an integrated Earned Value Management System (EVMS) in accordance with EIA-748, *Earned Value Management Systems*. The Contractor's EVMS shall be linked to and supported by the contractor's management processes and systems to include the IMS, contract WBS, change management, material management, procurement, cost estimating, and accounting. The Contractor shall correlate and integrate these systems and processes to provide for early indication of cost and schedule problems, and their relation to technical achievement. *(This paragraph is only applicable for CPIF CLINs.)*
- b. The Contractor shall perform an Integrated Baseline Review (IBR) with NASA to establish and maintain the contract baseline. *(This paragraph is only applicable for CPIF CLINs.)*
- c. The Contractor shall establish, maintain, implement, and deliver a contract Work Breakdown Structure (WBS) and a WBS dictionary in accordance with *Work Breakdown Structure (WBS) and Dictionary (DRD USDV-6)*. The contract WBS and Dictionary shall indicate the mapping of the Contractor WBS to the contract SOW. The Contractor shall utilize the contract WBS to serve as the framework for contract planning, budgeting, cost reporting, resource loading, and schedule status reporting to the ISS Program Office. Elements of work provided by major subcontractors (as defined in, *Contractor Financial Management Report (NF533)*) **(DRD USDV-8)** shall also be identified in the contract WBS. *(DRD USDV-8 is only applicable for CPIF CLINs.)*
- d. The Contractor shall develop, deliver, and implement monthly financial and earned value management reporting in accordance with *Contractor Financial Management Report (NF533)* **(DRD USDV-8)**, and *Integrated Program Management Data Analysis Review (IPMDAR)* **(DRD USDV-7)**. *(DRD USDV-8 is only applicable for CPIF CLINs. DRD USDV-7 Contract Performance Dataset portion is only applicable for CPIF CLINs. USDV-7 Schedule and Performance Narrative Report portions are applicable for all CPIF and FFP CLINs.)*

2.2.3 BUSINESS OTHER

- a. The Contractor shall develop, implement, maintain, deliver, report, and operate in compliance with the Organizational Conflicts of Interest Avoidance and Mitigation Plan submitted in accordance with *Organizational Conflicts of Interest (OCI) Plan* **(DRD USDV-10)**.
- b. The Contractor shall develop, implement, maintain, deliver, and operate in compliance with the Government Property Management Plan submitted in accordance with *Government Property Management Plan* **(DRD USDV-16)**.
- c. The Contractor shall deliver the required financial and logistics reports in accordance with *Financial Reporting Contractor-Held Property* **(DRD USDV-17)**.
- d. The Contractor shall develop, implement, maintain, deliver, and operate in compliance with the Diversity, Equity, Inclusion, and Accessibility (DEIA) Plan submitted in accordance with *Diversity, Equity, Inclusion, and Accessibility (DEIA) Plan* **(DRD USDV-12)**.

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- e. The Contractor shall develop, implement, maintain, deliver, and operate in compliance with the Small Business Subcontracting Plan and deliver required reports in accordance with *Small Business Subcontracting Plan and Reports (DRD USDV-11)*.

2.3 CONFIGURATION MANAGEMENT

- a. The Contractor shall develop, implement, and administer configuration management operations as specified in this contract and in accordance with SSP 41170, *Configuration Management Requirements*.
- b. The Contractor shall develop, deliver, maintain, and implement a configuration management plan in accordance with *Configuration Management Plan (DRD USDV-13)*.
- c. The Contractor shall maintain a single electronic technical library that contains all technical data, drawings, and documents related to the USDV functional and performance baseline maintained under a configuration management system by the Contractor and subcontractors. The aforementioned technical data, drawings, and documents shall be readily, directly accessible both remotely and onsite to NASA and NASA support contractors, searchable, and downloadable to support NASA insight.

2.3.1 CONFIGURATION STATUS ACCOUNTING AND VERIFICATION

- a. The Contractor shall identify, establish, maintain, and provide NASA access to reconciled configuration baselines for all hardware in accordance with SSP 41170, *Configuration Management Requirements*.
- b. The Contractor shall ensure that the application of Configuration Status Accounting (CSA) requirements and Contractor systems to maintain the USDV hardware and software product baselines are in accordance with SSP 41170, *Configuration Management Requirements*.
- c. The Contractor shall develop, maintain, and implement a Configuration Hardware and Software Status Accounting system in accordance with SSP 41170, *Configuration Management Requirements*. This includes processes and provisions for reports and/or access to CSA data by NASA and ISS support contractors. The Contractor shall ensure that historical configuration data is properly retained in a closed-loop accounting and verification system. The Contractor shall reconcile the CSA data with operational procedures, drawings, and modifications.
- d. The Contractor shall participate in NASA audits of compliance with Configuration Management requirements and processes by providing access to personnel, facilities, and data.

2.3.2 CONFIGURATION CONTROL/CHANGE MANAGEMENT

- a. The Contractor shall review, process, and evaluate NASA changes in accordance with SSP 41170, *Configuration Management Requirements*. The Contractor shall review and evaluate changes, originating from outside the contract, when required, to determine if those changes have potential impacts to the contract. The change management process shall be conducted in accordance with SSP 50123, *Configuration Management Handbook*. The USDV is an ISS Core System as defined in SSP 41170, *Configuration*

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Management Requirements. During CLIN 1, assume one Category B change (impact, further evaluation required) originating from outside the contract per quarter. Following CLIN 1 closure, Category B changes will be evaluated using CLIN 5.

- b. The Contractor shall assess and provide a determination of the category a change falls into: Category A (no impact or administrative change only) or Category B (impact, further evaluation required). For Category B changes, the Contractor shall evaluate and respond, within 30 calendar days unless specified otherwise from initial change notification, with an impact assessment to include: (1) whether the change can be implemented, (2) when the change can be implemented, (3) an impact assessment for which USDV products are affected, (4) technical risk assessment associated with implementation and (5) a qualitative cost/price and schedule Rough Order of Magnitude (ROM) determination required for implementation.
- c. The Contractor shall submit deviations and waivers in accordance with SSP 41170, *Configuration Management Requirements*. The Contractor shall review and evaluate Program deviations, waivers, and exceptions originating from outside the contract, when required, to determine if those deviations, waivers, or exceptions have potential impacts to the contract. The deviation and waiver process shall be conducted in accordance with SSP 50123, *Configuration Management Handbook*. The USDV is an ISS Core System as defined in SSP 41170, *Configuration Management Requirements*.
- d. The Contractor shall use the ISS Program Configuration Status Management Operations System (COSMOS) data base to review and respond to ISS change requests, deviations, and waivers.

2.4 INFORMATION TECHNOLOGY (IT)

- a. The Contractor shall perform all IT functions required to execute the USDV contract. The Contractor shall develop, implement, deliver, maintain, and operate within the IT Security Management Plan and IT Security Plan(s) in accordance with *Information Technology Security Management Plan (ITSMP) (DRD USDV-14)*.
- b. The Contractor's IT and Operational Technology systems, which store, process, or disseminate NASA information shall comply with NPR 2810.1, *Security of Information Technology*.

2.5 EXPORT CONTROL MANAGEMENT

- a. The Contractor shall develop, implement, maintain, deliver, and operate in compliance with the Export Control Plan submitted in accordance with *Export Control Plan (DRD USDV-15)*.
- b. The Contractor shall perform all Export Control functions required for the USDV contract.
- c. The Contractor shall ensure that only specific data that has been identified as Export Administrative Regulations (EAR) and international Traffic in Arms Regulations (ITAR) designations is marked with an appropriate Destination Control Statement that includes the export classification and corresponding export authority. Other data within deliverables that is not export controlled should not be globally marked as EAR or ITAR by default.

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- d. The Contractor shall ensure that products determined suitable for public release by the NASA and Contractor are labeled accordingly.
- e. The Contractor shall interact with ISS International Partners (IP) (e.g., Roscosmos, European Space Agency (ESA), Japanese Aerospace Exploration Agency (JAXA), Canadian Space Agency (CSA)) and their IP related entities to support the implementing arrangement between NASA and IPs for the decommissioning of the ISS.
- f. The Contractor shall perform technical interactions with IPs and IP related entities that are necessary for exchange of data, hardware, and software. It shall be the responsibility of the Contractor to seek and establish Technical Assistance Agreements or other appropriate Government Authorizations, as needed for technical interactions with the international partners. In the event a Contractor is unable to establish the required Technical Assistance Agreement or other appropriate Government authorizations with an ISS International Partner, the Contractor shall notify the NASA Contracting Officer with what steps and timeline the Contractor has taken to submit and obtain such authorizations, and the documented responses received by the ISS International Partner or United States government licensing agencies.

2.6 NASA INSIGHT AND APPROVAL

- a. The Contractor shall develop, implement, maintain, deliver, and operate in compliance with an Insight Management Plan in accordance with *Insight Management Plan (DRD USDV-5)*.
- b. The Contractor shall provide all NASA designated personnel (including support contractors) direct access to facilities, USDV flight hardware, Ground Support Equipment (GSE), personnel, and support services to accommodate the requirements as specified in the Contract. The Contractor shall provide access for all aspects of manufacture and processes, assembly, integration, test, evaluation, verification, training, sustaining, and operations of the USDV. The Contractor shall process and grant access to NASA designated personnel within 5 business days of the NASA request.
- c. The Contractor shall provide all NASA designated personnel (including support contractors) direct access, both remotely and onsite, to data and systems including, but not limited to: management information, schedule data, cost data (*applies to CPIF only*), technical data, documentation, drawings, patterns, models, analyses, products, manufactured product information, documents, changes, issues, non-conformances, waivers, deviations, anomalies, anomaly resolutions, imagery (still and video), audit results, corrective actions, quality assurance data, purchase orders, work orders, engineering resource planning, engineering order reports, configuration files, procedures (planned and as-run), timelines (planned and as-run), raw and processed telemetry, test environment configurations (planned and as-run), test data and results, risk management systems, quality management systems, configuration management systems, approval systems, requirement management and verification systems, metadata, supporting information, and operations data. This is applicable to data and systems used by and generated by the Contractor and its subcontractors in support of the USDV Contract.

The Contractor shall ensure aspects associated with access to data include the following:

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1. Be in a useable and readable format within the Contractor database that is accessible by NASA at all times from onsite and remote locations for three years post USDV mission completion
 2. Provide this information for all aspects of the design, development, analysis, manufacture and processes, integration, test, evaluation, verification, acceptance, training, sustaining, and operations of the USDV
 3. Organize and catalog these records so that they may be rapidly located and retrieved by NASA to support ground and on-orbit operation
 4. Provide a method of sharing, reporting, collecting, recording, and accessing USDV data between NASA and NASA support personnel, the Contractor, and the Contractor's safety critical subcontractors/vendors to enable immediate collaborative access
 5. Retrieval from a single source of the Contractor's IT systems
 6. Access capability provided to NASA as soon as possible after contract award, but no later than 45 calendar days prior to the Mission Concept Review (MCR) kick-off and be maintained through the life of the USDV contract
 7. Manufacturing process, quality records, and any other data for the Government to perform a successful risk-based analysis/assessment (RBA) that will facilitate the identification of high-risk areas and closure of identified Product Assurance Actions (PAAs)
- d. The Contractor shall provide access to performance, anomaly, and anomaly resolution data on non-NASA missions that utilize hardware and software similar to USDV.
 - e. The Contractor shall notify NASA within 24 hours of any identified major nonconformances and report a summary of minor nonconformances during PMR for nonconformances identified at the Contractor and subcontractor level.
 - f. The Contractor shall provide a NASA Resident office, with a maximum capacity of two (2) personnel, at the Contractor's facility for the life of the contract.
 - g. The Contractor shall provide advanced notice of and allow Government attendance at all activities (e.g., tests, audits, test readiness reviews, and pre-ship reviews (PSRs) of flight hardware).
 - h. The Contractor shall allow IP/Participant (e.g., Roscosmos, ESA, JAXA, CSA) personnel attendance at designated events and locations, when requested.
 - i. The Contractor shall provide the capability for NASA and its support service contractors to request, capture, and upload/download imagery of the USDV and ground support equipment for NASA use throughout all phases of the USDV contract.
 - j. In addition to NASA oversight and approval stipulated elsewhere in the contract, NASA approval is required for the following:
 1. The USDV System and subsystem (including software) baseline design and changes to the baseline design.
 2. Major nonconformances identified at Material Review Board (MRB).

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3. NASA ISS Program Office approval is required for Category 1 Material Usage Agreements (MUAs) as defined in NASA-STD-6016, *Standard Materials and Processes Requirements for Spacecraft*.
 4. NASA Engineering Materials and Processes Office approval is required for Category 2 MUAs as defined in NASA-STD-6016, *Standard Materials and Processes Requirements for Spacecraft*.
 5. Use of any hardware (system, subsystem, or component) previously flown on a spacecraft for use in the USDV.
- k. NASA insight is required as specified in the contract, including the following:
1. Subsystem and component Specifications including performance requirements
 2. Test Readiness Reviews and associated packages including description of test apparatus, test sequence and levels, configuration drawings and schematics, and test procedures
 3. Subsystem and Component Level Design Reviews
 4. Interface requirements between the USDV and GSE
 5. Safety and Mission Assurance Compliance Evaluations (prime and subcontractor)
 6. Non-USDV mission reviews, plans, and schedules insofar as they create risk to USDV production progress
 7. Minor nonconformances identified through MRBs
 8. Fabrication, assembly/integration, test, and packing/shipping/handling/transport plans and procedures that demonstrate control of risks to hardware integrity such as excess pressure, temperature, applied loads, voltage/current, humidity, contamination, corrosion, etc.
 9. Category 3 deviations from Materials and Processes requirements using the MUA system in accordance with NASA-STD-6016, *Standard Materials and Processes Requirements for Spacecraft*
 10. Observation of the Contractor's non-USDV vehicle operations on a non-interference basis to support NASA training

2.7 PROJECT LIFE-CYCLE REVIEWS

The intent of the Project Life-Cycle Reviews is to provide data, materials, and a forum for open dialog between NASA and the Contractor with respect to USDV design, development, testing, verification, integration, acceptance, and operations.

- a. The Contractor shall deliver a Project Life-Cycle Review Plan in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*.
- b. The Contractor shall include a formal Review Item Discrepancy (RID)/Request for Action (RFA) process for all Project Life-Cycle reviews.
- c. The Contractor shall perform activities, conduct Project Life-Cycle reviews, and provide verifications according to their internal processes, to confirm that the USDV System and

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its subsystems are being implemented in a manner that satisfies the NASA requirements.

2.8 TECHNICAL AND PROGRAM INTEGRATION MEETINGS

- a. The Contractor shall provide technical and programmatic subject matter expertise to NASA Program meetings, boards, and reviews, and provide program and technical data to inform NASA decision-making, perform evaluations and support other programmatic activities as requested by NASA, to include participating in NASA-led boards, meetings, System Problem Resolution Team meetings, Avionics and Software telecons, briefings, forums, working groups, and other activities.
- b. The Contractor shall allow NASA participation in the Contractor's, subcontractors' and vendors' technical meetings, boards, reviews, tests related to the design, development, testing, verification, certification, integration, and operations of the USDV.
- c. The Contractor shall lead an executive meeting every two weeks with NASA Program Management to review current USDV status, plans, anomalies, risks, mitigations, and issues.

2.9 DESIGN, DEVELOPMENT, TEST, AND EVALUATION (DDT&E)

The Contractor shall deliver, implement, and operate in accordance with the *Design, Development, Test, and Evaluation (DDT&E) Plan (DRD USDV-25)*, which details the methods, processes and process controls used to evolve the USDV into flight ready hardware for delivery to NASA

2.9.1 DESIGN AND CONSTRUCTION STANDARDS

NASA standards provide a roadmap of how NASA requires the Contractor to design, build, test and sustain the USDV. Design and Construction and Safety standards are proven methods to improve safety for human spaceflight and there are critical requirements embedded in them.

- a. The Contractor shall develop, implement, maintain, deliver, and operate in compliance with NASA Standards and Specifications Compliance and Tailoring in accordance with *NASA Standards and Specifications Compliance and Tailoring (DRD USDV-33)*. In the event any proposed alternate and/or tailored standards are not approved during the Initial DRD submission (with the Proposal) or the Updated DRD submission (MCR), they shall be approved through the final DRD submission (PDR), otherwise the NASA standard shall be applicable.
- b. NASA will be responsible for a NASA-led adjudication process to approve alternate or tailored standards proposed by the Contractor.
- c. The Contractor shall engage NASA for any alternate and/or tailored standards at any time during contract performance if any deviation, waiver, or update is proposed to an already approved DRD. Early engagement by the Contractor is encouraged to assure NASA acceptance prior to a DRD submission for approval.
- d. NASA will lead adjudication of the Contractor proposed alternate and/or tailored standards and specifications. The Contractor shall identify a USDV Point of Contact (POC) for each proposed alternate and/or tailored standard. The USDV POC shall participate, provide submission of the requested information detailed below, and represent the USDV Contractor during the adjudication process. Adjudication will

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includes information from both NASA and Contractor related to the following items:

1. An assessment of the estimated schedule, technical, and risk impacts associated with using the Contractor proposed versus NASA standard
 2. An assessment of past and current efforts to meet the intent of the standard with proposed alternate and/or tailored standards
 3. Documented key areas of disagreement with input from NASA
 4. Decisional package for presentation at a NASA Control Board with input from NASA
- e. NASA will have primary responsibility for assessing “meets the intent” for each proposed alternate and/or tailored standard, prior to any approval date associated with *NASA Standards and Specifications Compliance and Tailoring (DRD USDV-33)*, as well as following final adjudication after any NASA Control Board decisions.
- f. NASA will have final approval authority for use of alternate standards and tailoring.

2.9.2 DESIGN, ANALYSIS, AND TRADES

- a. The Contractor shall perform all engineering analyses necessary to develop and design a USDV that meets all system requirements, interface requirements, and lower-level requirements. The Contractor shall document the results of all analyses performed and make available for review by NASA throughout contract including at Project Life-Cycle Reviews and PMRs.
- b. The contractor shall perform a Re-programmability trade study showing that the full list of avionics including logic devices (firmware, Field Programmable Gate Array (FPGAs), etc.) has been assessed for mission suitability to ensure that each device's mission criticality, complexity, risk, and likely need for updates was taken into account to determine the device selection, architecture and method required for update in accordance with the *Software Management Plan (DRD USDV-24)*. The USDV Contractor shall indicate, which devices require removal and replacement, approximate level of schedule or mission impact, whether the device requires crew reconfiguration to reprogram, special software to perform reprogram, and other limitations the designer deems important to point out.

2.9.3 INTERFACE MANAGEMENT

- a. The Contractor shall provide technical support and USDV inputs required to develop Interface Control Documents (ICDs) between USDV and external interfaces including:
 1. USDV-to-LV ICD
 2. USDV-to-ISS ICD(s)
 3. USDV-to-ISS Software ICD(s)
 4. USDV-to-Ground ICD
 5. USDV-to-Near Space Network ICD
 6. USDV Training Simulator to NASA Mission Training Center (MTC) ICD

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7. Software Development and Integration Laboratory (SDIL) to USDV SDIL Simulator ICD
8. Hardware/software ICD between USDV and Government Furnished Property

2.9.4 TEST AND VERIFICATION (T&V)

- a. The Contractor shall perform T&V in accordance with SSP 51101, *U.S. Deorbit Vehicle Systems Requirements Document* and SSP 41170, *Configuration Management Requirements*.
- b. The Contractor shall provide the following T&V documents:
 1. Verification and Validation Plan – *Verification and Validation Plan (DRD USDV-26)*, is a USDV document defining the requirements and approach to the USDV System, subsystem and component testing consistent with the *U.S. Deorbit Vehicle Integration Plan* (SSP 51105).
 2. Joint Integration Verification and Test Plan (JIVTP) – The JIVTP is a jointly developed document defining the requirements and approach for integrated testing of USDV with participation of NASA personnel.
- c. For all joint test activities identified in the JIVTP, the Contractor shall conduct Joint Test Readiness Reviews (JTRR), co-chaired by NASA. The Contractor shall demonstrate overall readiness of the test articles, facilities, support equipment, test teams, and agreements (e.g., test hardware, software, procedures, and data exchanges), including the following:
 1. Objectives of the testing have been defined and documented, and all the test plans, procedures, environments, and configurations of the test item(s) support those objectives.
 2. Configuration of the system under test has been defined and agreed to. All interfaces have been placed under configuration management or have been defined in accordance with an agreed-to plan, and a software Version Description Document (where applicable) has been made available to TRR participants prior to the review.
 3. Pass/Fail criteria are defined and agreed to.
 4. GSE and interface simulators are in place and support the test objectives.
 5. All applicable functional, unit-level, subsystem, system, and qualification testing has been conducted successfully.
 6. All JTRR-specific materials such as test plans, test cases, and procedures have been made available to all participants at least three (3) working days prior to conducting the review.
 7. All known system discrepancies have been identified and dispositioned in accordance with an agreed-upon plan.
 8. All previous design review success criteria and key issues have been satisfied in accordance with an agreed-upon plan.

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9. All required test resources people (including a designated test director), facilities, test articles, test instrumentation, and other enabling products have been identified and are available to support required tests.
 10. Roles and responsibilities of all test participants are defined and agreed to.
 11. Test and contingency planning have been accomplished, and all personnel have been trained.
 12. Facility safety has approved all hazardous procedures and concurs with controls that are in place.
- d. The Contractor shall perform Software V&V Re-verification and re-analysis when any of the following occur:
1. Requirement, Data Item/Element, and Interface changes affect operating software
 2. Design changes affect operating software function or reliability
 3. Software code changes occur that affect requirements or flight software capabilities
 4. Inspection, test, mission change, or other data indicate a more severe environment or operating condition than originally verified and validated to.

2.9.5 TECHNICAL PERFORMANCE MEASURES (TPM)

The Contractor shall track and report TPMs performance budgets, current margins, and trending data at Project Life-Cycle Reviews and PMRs. The TPMs are metrics to evaluate design progress toward meeting system performance requirements. The Contractor's TPMs shall include, but are not limited to:

- a. Mass margin, including margin associated with compatibility with the LV
- b. Power margins (free flight and docked)
- c. Thermal margins
- d. Propellant margins
- e. Control system stability margins
- f. Thrust versus predicted/specified
- g. Computer & Software Processor, Command and Data Handling Busses and Memory Utilization

2.9.6 TEST FACILITY CAPABILITY

- a. The Contractor shall develop, maintain and operate a high-fidelity, integrated Hardware-In-The-Loop (HITL) configuration-controlled test bed, exercising all necessary flight-like hardware and software components for the verification of flight-critical mission objectives in accordance with *Specification for USDV Avionics and Software/Hardware-In-The-Loop (HITL) Test Bed (DRD USDV-46)* and the following:
 1. The HITL shall use flight-like hardware for all components needed to meet mission objectives.

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2. The HITL shall have a complete complement of devices containing flight software (including firmware, programmable logic, and redundant strings).
3. The HITL shall have the capability to verify redundancy, including failover, Failure Detection and Isolation Response (FDIR), manual and automated recovery capabilities, and any vehicle architecture specific failures.
4. The HITL shall have the capability to verify the software loading process, including patch capability.
5. The HITL shall have the capability to perform flight-following of the USDV to follow on-orbit activities, reproduce and troubleshoot on-orbit issues, and allow for fast-turnaround mitigations for hardware or software issues found on-orbit, including patch mitigation.
6. The HITL shall have the capability to verify and validate the USDV functions, including but not limited to: Guidance Navigation and Control (GNC); simulated and flight-like relative navigation sensors used for ISS rendezvous; navigation sensors used for mated attitude control, mated translational maneuvers; propulsion controllers; command and data handling functions; and Radio Frequency (RF) communications for all telemetry and command paths.
7. The HITL shall have the capability to connect with NASA Mission Systems to provide telemetry and receive commands as per the USDV-to-Ground ICD to perform flight following, and NASA Mission Systems to USDV verification and operations testing.
8. The HITL devices shall have the ability to load and execute the actual flight software identically to the actual flight avionics hardware with regard to functionality, timing, and performance.
9. The HITL harnesses, cables and connectors shall be flight-like: lengths (where necessary to maintain electrical similarity to flight cables, i.e., where nominal length contributes significantly to signal impairment), wire-types, production breaks, connector locations, pinouts, and flight configuration.
10. The HITL models and simulations shall be assessed for flight realism in the relevant environment and certified to provide sufficient fidelity to perform verification (Model anchoring) in accordance with *Models and Simulations (DRD USDV-39)*.
11. The Contractor shall perform and deliver an assessment of the differences between the full list of actual USDV flight hardware and components used in the HITL Test Bed in accordance with *Specification for USDV Avionics and Software/Hardware-In-The-Loop (HITL) Test Bed (DRD USDV-46)*. This assessment shall include Model anchoring, alternate test facilities and their scope, historical performance issues, supplier quality limitations, and exceptions to test-as-you-fly.

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- b. The Contractor shall develop, transfer, maintain and operate a configuration controlled USDV SDIL Simulator for use in the Houston ISS SDIL, for verification and validation of software requirements, ISS interface software development, certification and sustaining in accordance with *Specification for USDV SDIL Simulator for ISS Integration Testing (DRD USDV-47)* and the following:
1. The USDV SDIL Simulator shall use flight-like hardware for all components needed to meet mission objectives.
 2. The USDV SDIL Simulator shall have a complete complement for devices containing flight software (including firmware, programmable logic, and redundant strings) required to communicate with and through ISS, process commands and telemetry, and meet ISS interface requirements in SSP 51101, *U.S. Deorbit Vehicle Systems Requirements Document*.
 3. The USDV SDIL Simulator shall provide a flight like interface with the SDIL test facility in accordance with the ISS SDIL ICD per *Specification for USDV SDIL Simulator for ISS Integration Testing (DRD USDV-47)*.
 4. The USDV SDIL Simulator shall have the capability to verify the software loading process, including patch capability through ISS.
 5. The USDV SDIL Simulator shall have the capability to perform flight-following of the USDV with ISS as needed to follow on-orbit activities, reproduce, and troubleshoot on-orbit issues in the ISS to USDV interface, and allow for fast-turnaround mitigations for hardware or software issues found on-orbit, including patch mitigation.
 6. The USDV SDIL Simulator devices shall have the ability to load and execute the actual flight software identically to the actual flight avionics hardware with regard to functionality, timing, and performance.
 7. The USDV SDIL Simulator models and simulations shall be assessed for flight realism in the ISS environment and certified to provide sufficient fidelity to perform verification (Model anchoring) and validation, including the ISS/USDV/Ground Segment End to End Test and the ISS integrated software stage test in accordance with *Models and Simulations (DRD USDV-39)*.
 8. The Contractor shall perform and deliver an assessment of the differences between the full list of actual USDV flight hardware and components used in the USDV SDIL Simulator in accordance with *Specification for USDV SDIL Simulator for ISS Integration Testing (DRD USDV-47)*. This assessment shall include Model anchoring, alternate test facilities and their scope, historical performance issues, supplier quality limitations, and exceptions to test-as-you-fly.
 9. The Contractor shall deliver an USDV Interim SDIL Simulator (hardware and software) with the capability to perform risk-reduction, pathfinding development, and early characterization tests for joint test objectives unique to the USDV-ISS interface, including early joint tests specified in the JIVTP. The Interim SDIL Simulator may remain at SDIL for further early testing, or be transferred to the Contractor after early testing is complete.

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2.9.7 PREVIOUSLY FLOWN HARDWARE

- a. For previously flown hardware (components, subsystems, systems) used on the USDV, the USDV Contractor shall provide previously flown (preflown) hardware with the following criteria:
 1. Preflown hardware shall not elevate technical risk for the USDV functionality and performance as determined by NASA.
 2. Preflown hardware shall be enveloped within qualified service life as approved by NASA.
 3. Preflown hardware shall comply with USDV contract requirements (e.g., SSP 51101, SSP 30599, etc.).
 4. Preflown shall include a maintenance and refurbishment plan approved by NASA.

2.10 SOFTWARE MANAGEMENT

- a. The Contractor shall develop, implement, deliver, and operate per a Software Management Plan (SMP) in accordance with *Software Management Plan (DRD USDV-24)*.
- b. The Contractor shall establish and deliver the USDV software in accordance with SSP 50482, *ISS Software Management Plan* and NPR 7150.2, *NASA Software Engineering Requirements*.
- c. The Contractor shall perform third-party Independent Verification and Validation (IV&V) of safety critical processes and software necessary to complete the USDV mission that include but are not limited to:
 1. Functions needed for successful rendezvous and docking (Attitude control and Translational maneuvers, GNC (including control laws and gains), Relative GNC, and associated support functions)
 2. Functions needed for successful deorbit operations (Attitude control and Translational maneuvers, GNC (including control laws and gains), and associated support functions)
- d. The Contractor shall provide data for NASA IV&V in accordance with *Data Input for NASA Integration and Independent Verification & Validation (IV&V) (DRD USDV-31)*.
- e. Following CDR, the contractor shall communicate software issues, changes, and status to NASA as defined in the approved *USDV Software Management Plan (DRD USDV-24)*.

2.11 SAFETY, RELIABILITY, QUALITY, AND MISSION ASSURANCE

The Contractor shall perform all safety, reliability, quality, and mission assurance functions required to implement the scope of this contract.

The Hazard Analysis process [2.11.1] is central to all safety, reliability, quality, and mission assurance functions. Processes that inform the Hazard Analysis process include Probabilistic Risk Assessments (PRAs) [2.11.3], Failure Modes and Effects Analysis (FMEA) [2.11.2],

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Computer Based Control System (CBCS) Analysis [2.11.6], and PAAs [2.11.4]. A PRA provides a global view of system reliability; a FMEA provides a focused view of component reliability and failure consequences; CBCS Analysis focuses on software/firmware control; PAAs are used to focus on hardware fabrication and integration processes. Safety critical functions related to rendezvous, docking, and deorbit operations will need to be assessed by these processes to ensure the limitations of the design/fabrication/testing are addressed.

2.11.1 SAFETY

- a. The Contractor shall develop, implement, deliver, maintain, and operate in compliance with the Safety and Mission Assurance (S&MA) Plan submitted in accordance with *Safety & Mission Assurance (S&MA) Plan (DRD USDV-20)*.
- b. The Contractor shall develop, implement, deliver, and maintain a safety assessment in compliance with the Safety Data Package (SDP) in accordance with *Safety Data Package (SDP) (DRD USDV-21)*.
- c. The Contractor shall provide analysis for safety critical functions required to meet failure tolerance requirements in accordance with *Safety Data Package (SDP) (DRD USDV-21)* and SSP, 51101 *USDV SRD* Section 3.5.
- d. The Contractor shall perform and deliver Hazard Analysis (HA) on all systems developed for the USDV mission in accordance with SSP 30599, *Safety Review Process*, NPR 8715.7, *Payload Safety Program*, NASA-STD-8719.24, *NASA Payload Safety Requirements*, and KNPR 8715.3, *KSC Safety Procedural Requirements*. HAs will be approved by the ISS Safety Review Panel (ISRP) or jointly with Launch Services Program (LSP) Payload Safety Working Group (PSWG).
- e. The Contractor shall submit for NASA approval any Non-Compliance Reports (NCRs) identified via the HAs. NCRs will be processed in accordance with SSP 30599, *Safety Review Process* and approved by the appropriate NASA control board(s). For instances where only a single failure tolerant approach to a catastrophic hazard can be met, the Contractor shall provide acceptance rationale focused on the reliability of the system and other mitigations. The Contractor shall substantiate acceptance rationale on testing in environments relevant to the USDV mission, margins of safety, flight heritage of components used, number and duration of qualification units tested, testing to failure, life tests, etc.
- f. The Contractor shall complete USDV Phase 0, I, II, and III Safety Reviews with the ISRP or jointly with the ISRP and LSP PSWG in accordance with SSP 30599, *Safety Review Process*, NPR 8715.7, *Payload Safety Program*, NASA-STD-8719.24, *NASA Payload Safety Requirements*, and KNPR 8715.3, *KSC Safety Procedural Requirements*.
- g. The Contractor shall provide USDV data and subject matter expertise to support the development of ISS integrated systems-level hazard assessments performed by the ISS Sustaining Engineering prime contractor and/or International Partners as well as participate in the corresponding Safety Reviews with the ISRP in accordance with SSP 30599, *Safety Review Process*, as the USDV safety representative.
- h. The Contractor shall participate in all USDV-related safety working groups needed to prepare for or in response to issues identified at ISRP and LSP PSWG Safety Reviews in

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accordance with SSP 30599, *Safety Review Process*, NPR 8715.7, *Payload Safety Program*, NASA-STD-8719.24, *NASA Payload Safety Requirements*, and KNPR 8715.3, *KSC Safety Procedural Requirements*, as the USDV safety representative with associated subject matter expertise to address issues and concerns.

- i. The Contractor shall include all hardware, software, analysis, and support necessary to meet the applicable Range Safety Requirements (e.g., SSCMAN 91-710, *Range Safety User Requirements Manual* or GSFC-STD-8009, *Goddard Space Flight Center (GSFC) Wallops Flight Facility Range Safety Manual (RSM)*).

2.11.2 RELIABILITY

- a. The Contractor shall utilize reliability analysis techniques, approved by NASA in accordance with *Safety & Mission Assurance (S&MA) Plan (DRD USDV-20)* to inform the design of their systems. The Contractor shall deliver the results of these analyses to NASA. The Contractor shall incrementally revise these analyses to reflect the current design and deliver these revisions to NASA.
- b. For safety noncompliance and single point failures, the Contractor shall conduct Failure Mode and Effects Analysis (FMEA) and deliver the results in accordance with *Safety Data Package (SDP) (DRD USDV-21)*. Targeted use of FMEA is of benefit to NASA in evaluating safety risk of particular USDV components or subsystems.
- c. The Contractor shall ensure that the reliability analyses are implemented within the engineering design throughout the USDV design lifecycle.
- d. The Contractor shall ensure that all single point failures are addressed in the HA.

2.11.3 PROBABILISTIC RISK ASSESSMENT (PRA)

- a. The Contractor shall provide technical information in support of the PRA to be performed by the NASA ISS Program in accordance with *Safety Data Package (SDP) (DRD USDV-21)*.
- b. The Contractor shall participate in the ISS Program PRA analyses by supporting Working Groups and Technical Interchange Meetings (TIMs) with NASA PRA analysts to review PRA assumptions and results.

2.11.4 Quality Assurance (QA)

- a. The Contractor shall develop, implement, maintain, deliver, and operate in compliance in accordance with *Safety & Mission Assurance (S&MA) Plan (DRD USDV-20)*.
- b. The Contractor shall implement a QA system compliant with AS9100, *Quality Management Systems- Requirements for Aviation, Space and Defense Organizations*.
- c. The Contractor shall report to NASA all failures during qualification and acceptance tests, as well as failures during any additional testing performed with qualification or flight hardware (or equivalent), within 24 hours of occurrence, along with corrective actions taken. In the case of “Reportable Anomalies” (per SOW 2.11.9 *Anomaly Tracking and Reporting*, Paragraph b.), the Contractor shall safe and secure the test system and unit under test without breaking configuration until NASA has been notified.

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- d. The Contractor shall allow NASA participation in Contractor and subcontractor compliance and internal audits upon request. NASA insight will consist of monitoring NASA selected audits with the Contractor's auditors and inspectors to provide understanding of the Contractor's quality system and insight of their processes.
- e. The Contractor shall support required Government Quality Assurance (GQA) functions, including product examination, process witnessing, record review, audits, surveillance and assessments of contractor plans, procedures, and processes. GQA functions will be performed for all safety-critical items/processes/products identified by an RBA. An RBA is developed by NASA based on data provided by the Contractor. It is an iterative analysis based on a comprehensive understanding of the design, development, testing, critical manufacturing / assembly processes, and operations used to identify areas of risk. The Contractor shall support the RBA and all follow-on PAA closeout activities by providing technical expertise and resources for NASA insight and understanding of processes and procedures that are identified as critical, problematic, or have the potential for impact to schedule. Government audits and surveillance activities can encompass all disciplines and tasks that are involved with or support USDV operations, hardware and software production and maintenance, safety and quality assurance, engineering, logistics, procurement, and financial operations.
- f. The Contractor shall collect, compile, and retain information derived from empirical data (test results, analysis reports, inspection records, delivery logs, customer feedback, Government provided service usage, etc.) to demonstrate that the products and services delivered to the Government are in compliance with the requirements and specifications identified in this contract. The Contractor shall retain this data in a useable and readable format within a Contractor database that will be accessible by the Government from onsite and remote locations for three years post mission completion.
- g. The Contractor shall maintain, verify, and report the integrity of the flight hardware to ensure the USDV is preserved while interfacing with all GSE and facility systems, and account for natural and induced environments encountered throughout the handling/transportation operations, assembly/integration/testing, pre-launch processing, and launch operations phases.

2.11.5 NASA ADVISORIES AND GOVERNMENT INDUSTRY DATA EXCHANGE PROGRAM (GIDEP) FAILURE EXPERIENCE DATA PROCESSING

The Contractor and its sub-tier contractors shall participate in the GIDEP. The Contractor shall deliver a GIDEP implementation plan in accordance with *Safety & Mission Assurance (S&MA) Plan (DRD USDV-20)*.

2.11.6 SOFTWARE SAFETY AND ASSURANCE

- a. The Contractor shall assess and mitigate all hazards associated with software as part of the hazard assessment. The Contractor shall meet SSP 50038, *Computer Based Control System Safety Requirements* for software-based controls to hazards. The Contractor's software assurance planning shall be addressed in accordance with *Safety & Mission Assurance (S&MA) Plan (DRD USDV-20)*, and *Safety Data Package (SDP) (DRD USDV-21)*.

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- b. The Contractor shall develop and maintain a software quality management system in accordance with AS9115, *Quality Management Systems – Requirements for Aviation, Space and Defense Organizations - Deliverable Software*.

2.11.7 SAFETY AND HEALTH

The Contractor shall develop, implement, maintain, deliver, and operate in compliance with the Safety and Health Plan submitted and deliver reporting data in accordance with *Safety and Health Plan (DRD USDV-18)*. The Contractor shall take measures to protect the health and safety of personnel working on the contract and the operators using the hardware produced or used on the contract. When on NASA property, all contractor personnel shall follow the safety and health requirements of the local Center.

2.11.8 SUPPLIER MANAGEMENT

- a. The Contractor shall monitor and flow down applicable, technical, and contract requirements to all subcontractors/suppliers/vendors.
- b. The Contractor shall report subcontractors'/suppliers' problems affecting schedule (including nonconformances), quality, and performance to the Government.
- c. The Contractor shall accommodate NASA participation in subcontractor reviews and meetings. The Contractor shall notify the Government designee of supplier technical meetings, control boards, reviews, tests, and areas identified for GQA in the mutually agreed timeframe in accordance with *Insight Management Plan (DRD USDV-5)* and provide the resources necessary to permit meaningful Government participation through PAA closeout activities for safety critical items.

2.11.9 ANOMALY TRACKING AND REPORTING

- a. The Contractor shall develop, implement, maintain, and operate in compliance with a closed-loop anomaly tracking and resolution process for ground processing and flight operations that identifies and resolves any hardware or software performance characteristic that is or may be inconsistent with operational or design expectations. These anomalies can include, but are not limited to, ground hardware, software or flight vehicle problems, operations issues, non-conformances, deficiencies, ground test anomalies, in flight anomalies, and 'process escapes.' An anomaly is an unexpected event, hardware damage, departure from established procedures or performance, operator error, or a deviation of system, subsystem, or hardware or software performance outside intended design or expected performance specification limits. The Contractor shall make all anomalies accessible to NASA.
- b. The Contractor shall notify NASA of anomalies occurring on the USDV, GSE, or hardware that interfaces with the USDV. For reportable anomalies that occur from contract award to FRR, the Contractor shall notify NASA within 24 hours, but no later than at FRR. Anomalies that occur after FRR, the Contractor shall notify NASA as soon as possible. Reportable anomalies are those that fall into any of the categories below:
 - 1. Occur during standard repairs or nominal processing, sustaining, operations or maintenance tasks and indicate an unexpected trend in the USDV, USDV hardware, facilities used for acceptance or testing, or impact the success of the mission

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2. Any vehicle or launch integration anomaly that could result in launch delays that would impact the ISS deorbit flight plan, or occur on or affect the ISS mission, ISS vehicle, integrated operations, or safety of the ISS crew
 3. After resolution, negatively affect USDV operations, acceptance, hazards, hazard controls or verifications
 4. Any anomalies that cannot be explained or duplicated
- c. The Contractor shall provide subject matter expertise to address issues and concerns for any NASA-led investigation of anomalies, including real-time anomaly resolution (Failure Investigation Team, Anomaly Response Team).
 - d. For contractor and sub-contractor anomalies that are delegated as Contractor-led investigations, the Contractor shall determine the scope of the investigation and shall conduct and control the investigation. NASA may designate representatives to observe and participate in the Contractor's investigation of reportable anomalies. The Contractor shall accommodate Government representation to the Contractor's investigation.
 - e. The Contractor shall be responsible for identifying the cause of the anomaly and implementing corrective action(s). The Contractor shall provide NASA with access to any findings, any proposed corrective actions for reportable anomalies, and final closure rationale.
 - f. The Contractor shall identify, report, investigate, and track any on-orbit anomalies in accordance with MGT-OA-019, *On-Orbit Anomaly Resolution Process*.

2.11.10 MISHAP

The Contractor shall develop, implement, maintain, deliver, and operate in accordance with a Mishap Preparedness and Contingency Plan per *Mishap Preparedness and Contingency Plan (DRD USDV-22)*.

2.12 RISK MANAGEMENT

- a. The Contractor shall develop, implement, deliver, maintain, and operate in compliance with a Risk Management Plan in accordance with *Risk Management Plan (DRD USDV-19)*.
- b. The Contractor shall deliver and present risks at the PMR, Project Life-Cycle reviews, and other reviews/meetings as requested.
- c. The Contractor shall make its secure risk tracking database(s) remotely accessible to select NASA personnel at NASA Centers where electronic files are posted, and revisions maintained.
- d. The Contractor shall identify, evaluate, manage, and control the safety, technical, cost, and schedule-related risks associated with all aspects of the USDV.
- e. The Contractor shall develop the criteria, methods, and procedures used for identifying risk items.

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2.13 LAUNCH VEHICLE (LV) INTEGRATION

The Contractor shall support LV integration preparation and execution activities required to execute the USDV contract.

2.14 ISS INTEGRATION

- a. The Contractor shall provide data, analysis, and subject matter expertise to support ISS integrated analysis performed by NASA and NASA support contractors. Various integrated analysis will require iterative integration and data exchanges between the Contractor and NASA.
- b. The Contractor shall provide data deliverables, documented in Data Item Descriptions (DIDs) as part of the Bilateral Data Exchange Agreements, Lists, and Schedules (BDEALS), in support of ISS integrated analysis including, but not limited to:
 1. USDV drawings and engineering data. Data includes, but is not limited to:
 - i. Jet Firing Histories (nominal, single failure, and dual failure) during Rendezvous and Proximity Operations including 3 sigma dispersions with details of all thruster firings (time and specification of each thruster)
 - ii. Electrical Power System Stability, Steady State Interface Voltage, Secondary Power Quality Analysis and Secondary Power Faults Analysis
 - iii. Solar Array engineering data required for Integrated Plasma Analysis
 - iv. Integrated RF Environment and Mapping data
 - v. Microgravity and Vibration data required for an Integrated Microgravity analysis.
 - vi. Ionizing Radiation System Analysis
 - vii. External Contamination Releases required for Integrated External Contamination analysis
 - viii. Catastrophic Hazards (2 failure tolerance) and Design for Minimum Risk details
 - ix. Micrometeoroid and Orbital Debris Shielding and structural details required for Probability of No Penetration analysis
 - x. On-Orbit Transient Structural Loads
 - xi. Structural Clearance Analysis
 - xii. Energy Balance
 2. Computer-Aided Design (CAD) models in accordance with *Engineering Computer-Aided Design (CAD) Models (DRD USDV-35)*
 3. GNC models and data in accordance with *USDV GNC Models and Data (DRD USDV-45)*
- c. The contractor shall support iterative integration activities requiring multiple data exchanges, technical interchange meetings, board meetings, and panel meetings. For

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example, the iterative analyses required to jointly assess USDV's controllability while mated to ISS and operating within ISS limit loads. The analyses are anticipated to take multiple iterations based on historical attitude control capability development on ISS.

2.15 FLIGHT OPERATIONS

The Contractor shall perform flight operations preparation and flight operations functions required to execute the USDV contract. Flight Operations for the USDV spans the project life including operational assessments in DDT&E, operations product development; mission planning; Crew, flight controller, instructor, and Mission Management Team training; training simulator development; real-time mission execution, troubleshooting, anomaly investigations, post-flight mission analyses, debriefs and lessons learned for all nominal, contingency, and emergency operations.

- a. The Contractor shall participate in the USDV Joint Operations Panels, technical interchange meetings, working groups, and operational panels, boards, and reviews.
- b. The Contractor shall provide data, analysis, drawings, schematics, and imagery as needed for NASA to develop operational products, training material, flight rules, console displays, console tools, Operational Interface Procedures, and launch commit criteria.
- c. The Contractor shall provide support to NASA flight operation's systems, flight planning and flight analysis design and disciplines by providing the necessary data products, operational requirements, and support for NASA to develop the plans, processes, procedures, and tools to operate the USDV Systems beginning with the launch phase through the final deorbit. This includes the development and implementation of the processes, plans, system requirements, support and reference documents, training, procedures, fault and malfunction response products, and work associated with flight execution of the USDV. The scope includes technical assistance on troubleshooting, flight rules, flight plans, system briefs, reference products, flight design and analysis tools, system analysis tools, telemetry parameter selection, and displays necessary to prepare for and execute USDV flight operations.
- d. The Contractor shall provide technical inputs and review of mission planning and analyses necessary to execute USDV operations for all phases of the mission (e.g., pre-launch, ascent, LV separation, docking, on-orbit checkout, mated operations, and deorbit operations)
- e. The Contractor shall develop, deliver, provide training, and provide sustaining engineering support for a configuration controlled USDV Training Simulator to be used by the flight operations teams to train operators, troubleshoot anomalies, verify, and test Operational Products, and maintain operator proficiencies in accordance with the *Models and Simulation Plan (DRD USDV-39)* and JSC-35194, *MTC Training Center Generic Simulation Interface Specification*. The USDV Training Simulator shall:
 1. Be hosted within the MTC at Lyndon B. Johnson Space Center (JSC), either hosted on MTC hardware or running on USDV hardware with an interface to MTC hardware
 2. Integrate with ISS simulator models in the Integrated Training Simulation at the NASA MTC

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3. Be flight-like and operate with actual flight software to enable crew and flight control teams to ‘Train As You Fly’, execute nominal and off-nominal procedures, and for the instructors to input complex and integrated malfunctions and external conditions, and to be used to verify the behavior of the integrated system for procedure validation, real-time support and troubleshooting of anomalies
4. Be independently operated by NASA without the requirement of Contractor participation

3.0 DESIGN, DEVELOPMENT, TEST AND EVALUATION (DDT&E) THROUGH CRITICAL DESIGN REVIEW (CDR) (CLIN 1)

CLIN 1 includes scope needed to: 1) conduct a Contract Kickoff, 2) complete Mission Concept definition, 3) complete Systems Requirements definition, 4) complete System Definition, 5) complete PDR and establish a preliminary design, 6) complete CDR and finalize the design, 7) begin LV integration preparation, and 8) begin Flight Operations preparation. If CLIN 1 is FFP, the Project Lifecycle Reviews will be noted as C1 Milestones and completed in accordance with the associated Work Plan in Attachment J-30, Work Plans.

The USDV concept will be matured into an architecture defining the system, subsystems, system-level functional allocations and interfaces. Requirements definition will identify applicable requirements from SSP 51101, *U.S. Deorbit Vehicle Systems Requirements Document*, non-standard interfaces requested and any known exceptions, deviations, or waivers to requirements that will be required to execute the Contractor’s design.

3.1 RESERVED

3.2 LAUNCH VEHICLE INTEGRATION

Initial LV integration will occur throughout the DDT&E through CDR phases of the USDV contract.

- a. The Contractor shall provide technical inputs on spacecraft requirements in support of the development of the Launch Service Interface Requirements Documents (LSIRDs), including the LV interface diameter and Separation Systems.

3.3 FLIGHT OPERATIONS PREPARATION

Initial flight operations preparation will occur throughout the DDT&E phase through CDR phases of the USDV contract. The preparation includes the development of the pre-flight plans, processes, schedules, flight design and analyses, flight plans, procedures, and support products necessary to prepare for the USDV mission execution.

- a. The Contractor shall provide subject matter expertise to develop flight operational concepts.
- b. The Contractor shall develop and deliver the Operations Data book in accordance with *Operations Data Book (DRD USDV-38)* to reflect updates to vehicle systems, flight design, and analysis data for the USDV Flight System.
- c. The Contractor shall define all telemetry, commands, and other data link information in accordance with the *Command and Telemetry Dictionary (DRD USDV-37)*.

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- d. The Contractor shall develop jointly with NASA the USDV-to-Ground ICD and USDV Training Simulator to NASA Training Facility ICD. The ICD shall include a functional description of vehicle interfaces and NASA Mission Systems and USDV Training Simulator interfaces to NASA (MTC) during all ground, test, training, and on-orbit operations.
- e. The Contractor shall develop a configuration controlled USDV Training Simulator to be used by the flight operations teams to train operators, troubleshoot anomalies, verify, and test Operational Products, and maintain operator proficiencies in accordance with the *Models and Simulation Plan (DRD USDV-39)* and JSC-35194, *MTC Training Center Generic Simulation Interface Specification*.
- f. The Contractor shall attend Mission Systems Working Group meetings and provide technical input and status on the development of the USDV Training Simulator and the USDV Training Simulator to NASA Training Facility ICD
- g. The Contractor shall provide flight operations support in accordance with Section 2.15 *Flight Operations*.

3.4 AVIONICS & SOFTWARE SIMULATION AND TEST PREPARATION

USDV Avionics & Software Simulation and Test Preparation will examine the contractor's plans to implement USDV integrated testing and verification using the HITL Test Bed and the USDV SDIL Simulator for ISS integration testing.

- a. The Contractor shall prepare and deliver the Initial Specification for USDV HITL Test Bed in accordance with *Specification for USDV Avionics and Software/Hardware-In-The-Loop (HITL) Test Bed (DRD USDV-46)*.
- b. The Contractor shall prepare and deliver the Initial Specification for USDV SDIL Simulator for ISS integration testing in accordance with *Specification for USDV SDIL Simulator for ISS integration testing (DRD USDV-47)*.
- c. The Contractor shall organize, develop products for, and lead, with NASA as an approving co-chair, a USDV Avionics & Software Simulation and Test Bed specification review. The review shall assess readiness of the Test bed requirements outlined in SOW 2.9.6 *Test Facility Capability* and plan readiness status of software and test labs (including any non-compliances such as test bed/sim issues, test-as-you-operate exceptions, gaps in test bed fidelity, schedule challenges and problems compared to the verification test campaign plan, ship-short hardware, etc.) to proceed to CDR.
- d. The Contractor shall develop jointly with NASA the SDIL to USDV SDIL Simulator ICD.

3.5 CONTRACT KICK-OFF

- a. The Contractor shall develop and lead, with NASA as an approving co-chair, a Contract Kick-off meeting within three (3) weeks of the contract's start. The Contractor shall present an overview of their plans and approach for the USDV spacecraft development, including (but not limited to) their concept and technology development plans to develop a proposed system architecture that is credible and responsive to USDV requirements, mission assurance program, organization, design concept, trades, schedule, and facilities.

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The Contractor shall demonstrate that the requirements of the contract are clearly understood.

- b. The Contractor shall coordinate the agenda with NASA at least ten (10) calendar days prior to the meeting. The Contractor shall publish charts at least seven (7) calendar days prior to the meeting. The Contractor shall publish final charts, minutes, actions, and estimated closure dates within seven (7) calendar days after the meeting.
- c. The Contract Kick-off meeting shall include two splinter meetings:
 1. Technical Approach Splinter – The Contractor shall present:
 - i. A review of the initial *Concept of Operations (DRD USDV-4)*, USDV concept and long-range plans, approach to DDT&E, technology maturation, integration with ISS, integration with LV, and operations of the USDV
 - ii. A review of the organizational and management roles and responsibilities, key personnel, teaming, and subcontracting approach for the USDV
 - iii. Initial discussions of the USDV development approach, including functional, performance, and interface requirements, workmanship, and process standards to be followed, test and verification approach, data review and approval, NASA access to data, and data/hardware/software exchange
 - iv. A plan for obtaining a Top Secret//Sensitive Compartmented Information (SCI) facilities clearance prior to CDR in accordance with the Attachment J-38 DD Form 254, *Department of Defense Contract Security Classification Specification*, or proof of existing TS/SCI facilities clearance
 - v. Identify design and construction standards that prevent the use of flight proven designs, including the associated impact to cost and schedule
 2. Safety and Reliability Splinter – The Contractor shall present:
 - i. Initial discussions about the USDV safety approach, including reliability, safety critical components and software, quality, and other process standards to be followed
 - ii. A top-level concept overview and any preliminary hazard assessments conducted to date. The inability to complete the deorbit mission is defined as a catastrophic hazard and is further defined within SSP 51101, *U.S. Deorbit Vehicle Systems Requirements Document*.
 - iii. Identification of areas with current design/vehicle capability that do not meet safety fault tolerance or reliability requirements
 - iv. Initial discussion for reliability approach and maturation of any lower Technical Readiness Level (TRL) or non-flight environment tested hardware

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- v. Initial discussion for risk management approach and any early risk watch items

3.6 MISSION CONCEPT REVIEW (MCR)

The purpose of the MCR is to reach joint agreement on critical management plans and tools needed for successful development of the USDV. The approaches to be used to manage the development of the USDV, provide system and interface definition, V&V, and plan ground/flight operations are defined. The overall system architecture for the USDV is reviewed for effectiveness to meet the goals for the ISS deorbit.

- a. The Contractor shall organize, develop products for, and lead, with NASA as an approving co-chair, a USDV MCR to allow NASA to assess the progress towards meeting the USDV requirements.
- b. The Contractor shall demonstrate the proposed USDV mission concept meets NASA's requirements and is technically and logistically feasible. The Contractor shall demonstrate that the concept evaluation criteria to be used in candidate systems evaluation have been identified and prioritized. The Contractor shall demonstrate that technical planning is sufficient to proceed to the next phase and includes planning for hardware, software, human systems, and data deliverables. The Contractor shall demonstrate that risk and mitigation strategies have been identified and are acceptable based on technical risk assessments.
- c. The Contractor shall prepare, jointly with NASA, and deliver for NASA review, feedback, and concurrence, an MCR Joint Integration Plan (JIP) in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*.
- d. The Contractor shall present, deliver, and demonstrate the following content in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)* and the MCR JIP:
 - 1. MCR Data and Related Activities:
 - i. USDV System Specification
 - ii. Identify USDV functions, capabilities, and interfaces that are beyond standard requirements documented by NASA, including exceptions and alternate standards
 - iii. Identify design and construction standards that prevent the use of flight proven designs or existing industry designs, including the associated impact to cost and schedule
 - iv. Preflown Hardware Approach and Plan
 - v. Avionics and Software
 - a) Avionics and Software Architecture Concept
 - b) Autonomous Software Functions
 - c) Operational/Manual Software Functions
 - d) Telemetry and Commanding

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- vi. LV integration Launch Site Processing Planning
 - a) LV Performance requirements Medium or High as defined by Figure 6-1 of the *USDV Launch Vehicle Information Summary*)
 - b) Updated orbit insertion requirements (inclination and altitude)
 - c) Updated spacecraft mass (fully fueled NTE mass)
 - d) Spacecraft Center of Gravity (fully fueled)
 - e) Updated spacecraft Dimensions (Radial and Height)
 - f) Radiological sources (if any)
 - g) Plans for LV integration, launch site processing, and USDV readiness in preparation for launch
 - vii. Supplier management approach identifying major subcontractors and partners
 - viii. Identification of technical, cost, schedule, and safety risks and associated mitigations strategies/options
 - ix. Trade studies to be completed by the SRR are defined and action plans in place
 - x. Summary of IMS, Schedule Risk Assessment (SRA), Critical Path, and NASA Integration activities consistent with current monthly deliverable of *Integrated Program Management Data Analysis Report (IPMDAR) (DRD USDV-7)*
2. MCR Data Products Delivered:
- i. Final *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*
 - ii. Final *Insight Management Plan (DRD USDV-5)*
 - iii. Final *Mishap Preparedness and Contingency Plan (DRD USDV-22)*
 - iv. Initial *Configuration Management Plan (DRD USDV-13)*
 - v. Initial *Risk Management Plan (DRD USDV-19)*
 - vi. Initial *Qualification and Acceptance Plan (DRD USDV-44)*
 - vii. Update *Safety & Mission Assurance (S&MA) Plan* showing approach to safety, reliability, and quality assurance (**DRD USDV-20**)
 - viii. Update *TRL Assessment and Technology Maturation Plan (DRD USDV-23)*
 - ix. Initial *Software Management Plan (DRD USDV-24)* that shows software is managed in accordance with the ISS Program Software Management Plan, SSP 50482, *ISS Program Software Management Plan* and NPR 7150.2D, *NASA Software Engineering Requirements*
 - x. Update *Design, Development, Test, and Evaluation (DDT&E) Plan (DRD USDV-25)*

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- xi. Initial *Verification and Validation Plan* (**DRD USDV-26**)
 - xii. Final *System Engineering Management Plan* (SEMP) (**DRD USDV-27**)
 - xiii. Final *Program Management Plan* (**DRD USDV-1**)
 - xiv. Initial *USDV Spacecraft Readiness Plan* (**DRD USDV-30**)
 - xv. Update *NASA Standards and Specifications Compliance and Tailoring* (**DRD USDV-33**)
 - xvi. Update *Concept of Operations* (**DRD USDV-4**)
3. MCR Jointly Developed Products: The Contractor shall perform activities, support reviews, follow processes, and provide products in accordance with SSP 51105, *U.S. Deorbit Vehicle Integration Plan*, and for this Review.

3.7 SYSTEM REQUIREMENTS REVIEW (SRR)

The purpose of the SRR is to baseline the governing requirements and to mature associated products so that preliminary design can commence.

- a. The Contractor shall develop and lead, with NASA as an approving co-chair, a USDV SRR or series of reviews, to allow NASA to assess the progress towards meeting the USDV requirements.
- b. The Contractor shall demonstrate the proposed USDV functional and performance requirements defined for the USDV system are responsive to NASA requirements, reflect the systems intended operational use, and represent capabilities likely to be achieved within the scope of the project. The Contractor shall demonstrate the maturity of the requirements definition and associated plans. The Contractor shall demonstrate utilization of a sound process for the allocation and control of requirements throughout all levels, and a plan has been defined to complete the requirements definition at lower levels within the contractual schedule. The Contractor shall demonstrate system interfaces with external entities and between major internal elements have been identified. The Contractor shall demonstrate preliminary approaches have been determined for how requirements will be verified and validated. The Contractor shall demonstrate that technical planning is sufficient to proceed to the next phase and includes planning for hardware, software, human systems, and data deliverables. The Contractor shall demonstrate that major risks have been identified and technically assessed, and viable mitigation strategies have been defined.
- c. The Contractor shall prepare, jointly with NASA, and deliver for NASA review, feedback, and concurrence, an SRR JIP in accordance with *Project Life-Cycle Review Plan and Data Packages* (**DRD USDV-3**).
- d. The Contractor shall demonstrate detailed knowledge of the USDV requirements and demonstrate a plan and capability to satisfy the USDV requirements.
- e. The Contractor shall present, deliver, and demonstrate the following content in accordance with *Project Life-Cycle Review Plan and Data Packages* (**DRD USDV-3**) and the SRR JIP:
 - 1. SRR Data and Related Activities:

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- i. Closure of all MCR Action Items and RIDs/RFAs, or a closure plan exists for those remaining open
- ii. The overall concept of the USDV performance is reasonable, feasible, complete, responsive to the mission requirements, and is consistent with system requirements and available resources (schedule, mass, power, etc.)
- iii. The overall USDV System architecture, associated specifications, and the approach to system and subsystem design that satisfied key driving requirements and mission needs, including, but not limited to:
 - a) System Architecture description
 - b) USDV System Specification
 - c) USDV Subsystems identification and description
 - d) Avionics & Software
 - 1) Avionics & Software Architecture
 - 2) Preliminary Software Requirements Specification (SRS) or equivalent
 - 3) Command and Telemetry paths
 - 4) USDV-to-ISS Command/Telemetry Details (Data protocol Conversion if applicable, i.e., Ethernet to MIL-STD-1553)
 - 5) Command and Telemetry requirements
 - e) USDV Ground Segment Specification, if applicable
- iv. Preliminary approaches have been determined for how each requirement will be verified and validated down to the subsystem level
- v. Draft Technical Resource Management Plan identifying Technical Performance Measures (e.g., mass, prop, power, thermal) to be tracked throughout the project lifecycle and approach to margin management
- vi. Identify design and construction standards that prevent the use of flight proven designs or existing industry designs, including the associated impact to cost and schedule
- vii. Preflown Hardware Approach and Plan
- viii. LV Integration and Launch Site Processing status
 - a) Status on technical inputs to the development of the LSIRDs, including the LV interface diameter and Separation Systems
 - b) Updated Launch Vehicle Performance requirements Medium or High as defined by Figure 6-1 of the *USDV Launch Vehicle Information Summary*)
 - c) Updated orbit insertion requirements (inclination and altitude)
 - d) Updated spacecraft mass (fully fueled NTE mass)

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- e) Updated spacecraft Center of Gravity (fully fueled)
 - f) Updated spacecraft Dimensions (Radial and Height)
 - g) Updated radiological sources (if any)
 - h) Updates to Plans for LV integration, launch site processing, and USDV readiness in preparation for launch
- ix. Status on definition and development of operational products, training, and USDV Training Simulator
 - x. Status of Long Lead Parts procurement, including outstanding and completed
 - xi. Requirements and interface trade studies to be completed by SDR are defined and action plans are in place
 - xii. Identification of technical, cost, schedule, and safety risks and associated mitigation strategies/options
 - xiii. Summary of IMS, SRA, Critical Path, and NASA Integration activities consistent with current monthly deliverable of *Integrated Program Management Data Analysis Report (IPMDAR) (DRD USDV-7)*
2. SRR Data Products Delivered:
- i. *Initial Assembly, Integration and Test (AI&T) Plan (DRD USDV-32)*
 - ii. *Final Concept of Operations (DRD USDV-4)*
 - iii. *Final Configuration Management Plan (DRD USDV-13)*
 - iv. *Final Risk Management Plan (DRD USDV-19)*
 - v. *Final Safety & Mission Assurance (S&MA) Plan (DRD USDV-20)*
 - vi. *Final TRL Assessment and Technology Maturation Plan (DRD USDV-23)*
 - vii. *Final Software Management Plan (DRD USDV-24)*
 - viii. *Final Design, Development, Test, and Evaluation (DDT&E) Plan (DRD USDV-25)*
 - ix. *Update Verification and Validation Plan (DRD USDV-26)*
 - x. *Update System Engineering Management Plan (SEMP) (DRD USDV-27)*
 - xi. *Update Qualification and Acceptance Plan (DRD USDV-44)*
3. SRR Jointly Developed Products and Related Activities: The Contractor shall perform activities, support reviews, follow processes, and provide products in accordance with SSP 51105, *U.S. Deorbit Vehicle Integration Plan.*, and for this Review:
- i. Draft USDV-to-Ground ICD
 - ii. Draft USDV-to-ISS ICD
 - iii. Draft SDIL to USDV SDIL Simulator ICD

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- iv. Interface requirements are complete to proceed into the Preliminary Design phase with acceptable level of risk; at least 85% requirement approval is the goal
 - a) Proposed USDV SRD tailoring with risk assessment and rationale
 - b) Proposed USDV SRD exceptions with risk assessment and rationale
 - c) Approach to USDV SRD requirements verification is acceptable
 - d) Alternate standards are agreed to
- v. Draft BDEALS
- vi. Draft Bilateral Hardware and Software Exchange Agreements, Lists, and Schedules (BHSEALS)
- vii. Phase 0 Safety TIM topics per *Safety Data Package (DRD USDV-21)* is complete
 - a) System Safety approach satisfying USDV SRD
 - b) Acceptable approach to ensuring ground and flight safety, redundancy, reliability, and quality assurance
 - c) Preliminary Hazard Assessment for rendezvous, docking, and ISS integrated operations, including deorbit operations, is complete, and hazards and causes are identified.
 - d) Preliminary reliability approach
 - e) Preliminary list of hazardous commands

3.8 SYSTEM DEFINITION REVIEW (SDR)

The purpose of the SDR is to evaluate whether the USDV System architecture is responsive to functional, performance, and interface requirements and whether the requirements have been allocated to the next lower level. The SDR will gauge initial design progress on the path to the PDR.

- a. The Contractor shall organize, develop products for, and lead, with NASA as an approving co-chair, a USDV SDR to assess the progress towards meeting the USDV requirements.
- b. The Contractor shall demonstrate maturity of the USDV definition and associated plans is sufficient to begin preliminary design. The Contractor shall demonstrate the proposed USDV System architecture is credible and responsive to NASA requirements and constraints, including resources. The Contractor shall demonstrate all technical requirements are allocated to the USDV architectural elements. The Contractor shall demonstrate the architecture tradeoffs are completed, and those planned for the next phase adequately address the option space. The Contractor shall demonstrate the maturity of the USDV System definition and associated plans. The Contractor shall demonstrate planning exists for the development, insertion, or deployment of any enabling new technology. The Contractor shall demonstrate procurement and supply chain risk

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management execution is complementary with the technical development schedule. The Contractor shall demonstrate significant development, mission, and safety risks are identified and technically assessed, and a process and resources exist to manage the risks.

- c. The Contractor shall prepare, jointly with NASA, and deliver for NASA review, feedback, and concurrence, an SDR JIP in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*.
- d. The Contractor shall present, deliver, and demonstrate the following content in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)* and the SDR JIP:
 1. SDR Data and Related Activities:
 - i. Closure of all SRR Action Items and RIDs/RFAs, including those from prior reviews, or a closure plan exists for those remaining open
 - ii. The USDV technical approach is credible and responsive to the identified requirements
 - iii. Updates to the overall USDV System architecture
 - iv. Allocation of requirements to the next lower level
 - v. Identify design and construction standards that prevent the use of flight proven designs or existing industry designs, including the associated impact to cost and schedule
 - vi. Updates provided to Technical Resource Management Plan identifying TPMs (e.g., mass, prop, power, thermal) to be tracked throughout the project lifecycle and approach to margin management
 - vii. Development Hardware Testing (prototype, breadboard) is progressing for preliminary design validation
 - viii. Plan for GSE and Ground Facilities
 - ix. Updates provided to subcontractor/supplier engagement plans
 - x. Preflown Hardware Approach and Plan
 - xi. Status of Long Lead Parts procurement, including outstanding and completed
 - xii. Trade studies to be completed by the PDR are defined and action plans in place.
 - xiii. Updates to technical, cost, schedule, and safety risks and associated mitigation strategies/options
 - xiv. Summary of IMS, SRA, Critical Path, and NASA Integration activities consistent with current monthly deliverable of *Integrated Program Management Data Analysis Report (IPMDAR) (DRD USDV-7)*
 2. SDR Data Products Delivered:
 - i. *Initial Models and Simulation Plan (DRD USDV-39)*

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- ii. System-level Concept of Operations is current and supports mission objectives *Concept of Operations (DRD USDV-4)*
 - iii. Latest Baseline CAD models in accordance with *Engineering Computer-Aided Design (CAD) Models (DRD USDV-35)*
 - iv. Updates to *TRL Assessment and Technology Maturation Plan (DRD USDV-23)*
 - v. *Initial Specification for USDV Hardware In The Loop Test Bed (DRD USDV-46)*
 - vi. *Initial Specification for USDV SDIL Simulator for ISS integration testing (DRD USDV-47)*
3. SDR Jointly Developed Products and Related Activities: The Contractor shall perform activities, support reviews, follow processes, and provide products in accordance with SSP 51105, *U.S. Deorbit Vehicle ISS Integration Plan*.

3.9 PRELIMINARY DESIGN REVIEW (PDR)

The purpose of PDR is to confirm that the preliminary design meets all system requirements with acceptable risk and within the cost and schedule constraints and establishes the basis for proceeding with detailed design. The PDR occurs when the USDV design documentation is approximately 10 to 25% complete. In addition to reviewing status of the design and supporting activities (e.g., analysis, development testing), functional allocation of system requirements to subsystems are accomplished. Verification methods for requirements derived from the USDV SRD are identified.

- a. The Contractor shall organize, develop products for, and lead, with NASA as an approving co-chair, a USDV PDR to assess the progress towards meeting the USDV requirements.
- b. The Contractor shall demonstrate the ability of the preliminary design to meet all USDV requirements with acceptable risk within the identified cost and schedule constraints. The Contractor shall demonstrate necessary resource allocations and identify critical interfaces and requirements verification methods. The Contractor shall demonstrate requirements traceability, flow-down, and compliance with supporting design analyses. The Contractor shall demonstrate plans for the completion of system / subsystem development and subsequent operations are within the identified cost and schedule constraints.
- c. The Contractor shall prepare, jointly with NASA, and deliver for NASA review, feedback, and concurrence, a PDR JIP in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*.
- d. The Contractor shall present, deliver, and demonstrate the following content in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)* and the PDR JIP:

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1. PDR Data and Related Activities:
 - i. Closure of all SDR Action Items and RIDs/RFAs, including those from prior reviews, or a closure plan exists for those remaining open
 - ii. The preliminary design meets the requirements at an acceptable level of maturity to proceed into the final design phase
 - a) System and subsystem architecture summary (subsystem by subsystem and integrated system)
 - b) Any required new technology has been developed to an adequate state of readiness, or backup options exist and are supported to make them a viable alternative
 - c) USDV System, subsystems, interfaces to ISS, interfaces to LV, interfaces to NASA Mission Systems, and Ground Segment design summaries and how they meet required performance measures
 - d) Plan for Activation, Checkout and Commissioning is acceptable
 - e) Mission objectives are supported
 - f) Results of engineering trade studies in support of a preliminary USDV design
 - g) Status of the design and supporting activities (e.g., analysis, development testing)
 - h) Results of Development testing
 - i) Draft Verification Closure Notice (VCN) schedule
 - iii. Functional allocation of system requirements to subsystems is complete
 - iv. Updated USDV System Schematics
 - v. Subsystem design specifications, with supporting trade-off analyses and data
 - vi. Identify design and construction standards that prevent the use of flight proven designs or existing industry designs, including the associated impact to cost and schedule
 - vii. Avionics & Software
 - a) Completed definition of software architecture
 - b) Acceptance criteria for the software
 - c) Baseline SRS or equivalent
 - d) Software Development Tools
 - e) Code build tools
 - f) Coding Standards
 - g) Code quality monitoring

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- h) Management of Central Processing Unit and memory utilization
- i) Vehicle and Software Time Management
- j) Time synchronization technique, sensitivities, monitoring
- k) Data bus budget, timing, and performance
- l) Code development Milestones & Schedule
- m) (e.g., development code integration through Flight Code Qualification)
- n) Plans for reviews with the Contractor developers and NASA software teams
- o) Updated results of the Re-programmability trade study per *Software Management Plan (DRD USDV-24)*
- p) Simulation Development and Plan:
 - 1) Code development
 - 2) Flight qualification test
 - 3) Final full hardware and software acceptance testing
- viii. Evidence that USDV design documentation is approximately 10-25% complete
- ix. Technical performance status related to margins, comparison of actual versus predicted margin for TPMs, resolution of the previous review discrepancies addressing effectiveness of technical achievement and communicating the overall risk to the project
- x. Verification methods for requirements are identified
- xi. Outbrief of Phase I Safety Review including a preliminary list of single point failures and their effects as well as rationale for acceptance
- xii. Updates to plan and status for GSE and Ground Facilities
- xiii. Preflown Hardware Approach and Plan
- xiv. LV Integration and Launch Site Processing status
 - a) Status on technical inputs to the LSIRDs, including the LV interface diameter and Separation Systems
 - b) Updated Launch Vehicle Performance requirements Medium or High as defined by Figure 6-1 of the *USDV Launch Vehicle Information Summary*)
 - c) Updated orbit insertion requirements (inclination and altitude)
 - d) Updated spacecraft mass (fully fueled NTE mass)
 - e) Updated spacecraft Center of Gravity (fully fueled)
 - f) Updated spacecraft Dimensions (Radial and Height)

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- g) Proposed use of a Payload Fairing and any excursions outside of the Payload Fairing static envelope identified in Figure 6-2 of the *USDV Launch Vehicle Information Summary*, if applicable
 - h) Proposed mechanical interface to the launch vehicle
 - i) Proposed electrical interface to the launch vehicle
 - j) List of Mission-Unique or Non-Standard Services proposed that are not part of Baseline launch service defined in Section 7 of the USDV Launch Vehicle Information Summary
 - k) Any unique facility requirements for launch site processing
 - l) Updated radiological sources (if any)
 - m) Updates to Plans for LV integration, launch site processing, and USDV readiness in preparation for launch
- xv. Status on definition and development of operational products, training, and USDV Training Simulator
 - xvi. Updates provided to subcontractor/supplier engagement plans
 - xvii. Procurement Status
 - a) Overall procurement status
 - b) Supply chain risk management activities
 - c) Status of Long Lead Parts procurement, including outstanding and completed
 - xviii. Trade studies to be completed by CDR are defined and action plans are in place
 - xix. Updates to technical, cost, schedule, and safety risks and associated mitigation strategies/options
 - xx. Life-Cycle Cost and IMS ready for baselining after review comments are incorporated. Joint Confidence Level analysis completed.
 - xxi. Summary of IMS, SRA, Critical Path, and NASA Integration activities consistent with current monthly deliverable of *Integrated Program Management Data Analysis Report (IPMDAR) (DRD USDV-7)*
2. PDR Data Products Delivered:
- i. Initial *Imagery Plan (DRD USDV-28)*
 - ii. Initial *USDV Transportation and Logistics Requirements Plan (DRD USDV-29)*
 - iii. Initial *Data Input for NASA Integration and Independent Verification and Validation (IV&V) (DRD USDV-31)*
 - iv. Initial *Mass Properties Report (DRD USDV-34)*
 - v. Final *USDV Spacecraft Readiness Plan (DRD USDV-30)*

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- vi. Initial *Command and Telemetry Dictionary* (**DRD USDV-37**)
 - vii. Initial *Operations Data Book* (**DRD USDV-38**)
 - viii. Initial *USDV GNC Models and Data* (**DRD USDV-45**), Part A
 - ix. Final *Assembly, Integration and Test (AI&T) Plan* (**DRD USDV-32**)
 - x. Final *NASA Standards and Specifications Compliance and Tailoring* (**DRD USDV-33**)
 - xi. Final *Qualification and Acceptance Plan* (**DRD USDV-44**)
 - xii. Updates to *TRL Assessment and Technology Maturation Plan* (**DRD USDV-23**)
 - xiii. Update, including supplier and teaming engagement plans and status including subcontracts and agreements available for *Design, Development, Test, and Evaluation (DDT&E) Plan* (**DRD USDV-25**)
 - xiv. Update *Verification and Validation Plan* (**DRD USDV-26**)
 - xv. Update *Models and Simulation Plan* (**DRD USDV-39**)
 - xvi. CAD models in accordance with *Engineering Computer-Aided Design (CAD) Models* (**DRD USDV-35**)
3. PDR Jointly Developed Products and Related Activities: The Contractor shall perform activities, support reviews, follow processes, and provide products in accordance with SSP 51105, *U.S. Deorbit Vehicle Integration Plan*, and for this Review:
- i. Update USDV-to-ISS ICD
 - ii. Update USDV-to-Ground ICD
 - iii. Draft USDV Training Simulator to NASA Training Facilities ICD
 - iv. Update SDIL to USDV SDIL Simulator ICD
 - v. Draft USDV Software ICD
 - vi. Bilaterally approved USDV SRD Verification Planning Sheets at ~90% level
 - vii. Baseline BDEALS
 - viii. Baseline BHSEALS
 - ix. Draft Instrumentation Program and Command List (IP&CL)
 - x. Baseline plan for use of Government Furnished Data, Government Furnished Equipment (GFE), and other government services and resources (on- orbit and ground).
 - xi. Functional On-Orbit Validation plan to identify necessary activation and checkouts
 - xii. Phase I Safety Review data has been delivered, reviewed, and approved

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per *Safety Data Package (DRD USDV-21)*.

- a) Hazard Causes and Controls are approved by the ISRP
 - b) PRA inputs provided to NASA
 - c) FMEA at PDR maturity for any safety noncompliance or single point failures
 - d) Preliminary list of non-compliances
 - e) Updated list of hazardous commands
 - f) Computer Based Control System (CBCS) matrix and software architecture
- xiii. Analytical results support the preliminary design, USDV performances, and ISS integrated performance as documented in the BDEALS:
- a) Systems/Functional Availability Assessment – Baseline plan for Performance, Reliability, Redundancy, and Maintenance for subsystems that could impact ISS/NASA (Power, thermal, etc.) or ability to perform deorbit
 - b) System analysis summary including flight dynamics, GNC, integrated thermal, power, command, and data handling, and how they meet required performance measures
 - c) Plans are in place to exchange data needed for NASA Integrated Vehicle Performance analysis, e.g.,
 - 1) Structural/dynamics
 - 2) Rendezvous and thruster firing analysis
 - 3) Contamination analysis
 - 4) Updated CAD model including mass properties
 - 5) Controllability
 - 6) Communication analysis
- xiv. JIVTP

3.10 CRITICAL DESIGN REVIEW (CDR)

CDR demonstrates that the maturity of the design is appropriate to support proceeding with full scale fabrication, assembly, integration, and test. CDR determines if the technical effort is on track to complete the system development, meeting mission requirements within the cost and schedule constraints. The design and supporting products (e.g., analysis, engineering model testing) are reviewed in detail. Verification planning for requirements is finalized and jointly approved. Software architecture is finalized. Details of the qualification and acceptance test program are reviewed, and preliminary agreements on test hardware, software, and data exchanges are developed. Updated versions of the integration CAD are exchanged. Following successful CDR completion, the USDV hardware and software baseline is established and is configuration controlled.

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- a. The Contractor shall organize, develop products for, and lead, with NASA as an approving co-chair, a USDV CDR to assess the progress towards meeting the USDV requirements.
- b. The Contractor shall demonstrate that the design meets the final performance, functional and interface specifications. The Contractor shall demonstrate the maturity of the design and development effort justifies proceeding with full scale fabrication and AI&T. The Contractor shall demonstrate requirements compliance with supporting design analyses. The Contractor shall demonstrate progress is on track to complete flight, ground, and operations development within the identified contractual requirements.
- c. The CDR exit criteria shall include USDV hardware/software is baselined and under configuration control, RID/RFAs from CDR and previous reviews jointly dispositioned by NASA and the Contractor, and Forward Actions jointly identified and agreed upon by NASA and the Contractor.
- d. The Contractor shall prepare, jointly with NASA, and deliver for NASA review, feedback, and concurrence, a CDR JIP in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*.
- e. The Contractor shall present, deliver, and demonstrate the following content in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)* and the CDR JIP:
 1. CDR Data and Related Activities:
 - i. Closure of PDR Action Items and RIDs/RFAs, including those from prior reviews, or a closure plan exists for those remaining open
 - ii. Results of engineering trade studies, including PDR trade studies, in support of a final USDV design
 - iii. Updated baselined documents, if changed post PDR
 - iv. Baseline Design data package (e.g., integrated schematics, drawings, interface control documents, engineering analyses, and specifications) for USDV System and Subsystems, Interfaces (ISS, NASA Mission Systems, LV), Ground Segment that meets all technical requirements and performance measures:
 - a) USDV System overview
 - b) Subsystem by subsystem overview and design summary (power, data, thermal, structures, comm, propulsion, etc.)
 - c) Design changes summary since PDR
 - d) Status of design documentation and percentage complete for hardware and software, including evidence that USDV System design documentation is approximately 90% complete
 - e) Engineering Drawings and Drawing Tree
 - f) Updates to USDV System and Subsystem Schematics

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- g) Supporting analysis validating design
- h) Updated Engineering Analyses
- i) Waivers (e.g., where design does not meet technical requirements)
- j) Updated VCN schedule
- v. Technical performance status related to margins, comparison of actual versus predicted margin for TPMs, resolution of the previous review discrepancies addressing effectiveness of technical achievement and communicating the overall risk to the project
- vi. Avionics & Software
 - a) Updated results of the Re-programmability trade study per *Software Management Plan (DRD USDV-24)*
 - b) Completion and results of the Avionics & Software Simulation and Test Bed Specification Review
 - c) Command and telemetry list
- vii. Manufacturing and Fabrication Planning and Readiness
 - a) Product build-to specifications for each hardware and software configuration item, along with supporting tradeoff analyses and data
 - b) Status of Flight Hardware manufacturing
 - c) Fabrication plans and readiness to proceed to full-scale fabrication
- viii. Logistics Analysis (reliability, maintainability, availability, spares provisioning list)
- ix. Updates to Activation, Checkout, and Commissioning plan
- x. Operational limits and constraints
- xi. Results of Development Testing
- xii. Qualification hardware test readiness
- xiii. Details of the qualification and acceptance test program are reviewed, and preliminary agreements on test hardware, software, and data exchanges are developed
- xiv. Status and progress on obtaining licenses and permits
- xv. Outbrief of Phase II Safety Review including list of all single point failures and their effects as well as rationale for acceptance
- xvi. Initial identification of MRBs approved or pending
- xvii. Confirmation of readiness of GSE and ground facilities for production, manufacture, build, assembly, integration, and test
- xviii. Preflown Hardware Approach and Plan
- xix. LV Integration and Launch Site Processing status

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- a) Status on technical inputs to the LSIRDs, including the LV interface diameter and Separation Systems
- b) Updated Launch Vehicle Performance requirements Medium or High as defined by Figure 6-1 of the *USDV Launch Vehicle Information Summary*)
- c) Updated orbit insertion requirements (inclination and altitude)
- d) Updated spacecraft mass (fully fueled NTE mass)
- e) Updated spacecraft Center of Gravity (fully fueled)
- f) Updated spacecraft Dimensions (Radial and Height)
- g) Updates to proposed use of a Payload Fairing and any excursions outside of the Payload Fairing static envelope identified in Figure 6-2 of the *USDV Launch Vehicle Information Summary*, if applicable
- h) Updates to proposed mechanical interface to the launch vehicle
- i) Updates to proposed electrical interface to the launch vehicle
- j) Updated list of Mission-Unique or Non-Standard Services proposed that are not part of Baseline launch service defined in Section 7 of the *USDV Launch Vehicle Information Summary*
- k) Updates to unique facility requirements for launch site processing
- l) Updated radiological sources (if any)
- m) Updates to Plans for LV integration, launch site processing, and USDV readiness in preparation for launch
- xx. Status and burn down plan on development of operational products, training, and USDV Training Simulator
- xxi. Evidence of Top Secret//Sensitive Compartmented Information (SCI) facilities clearance in accordance with the Attachment J-38, *DD Form 254 Department of Defense Contract Security Classification Specification*
- xxii. Status of Long Lead Parts procurement, including outstanding and completed
- xxiii. Actions, trades, and issues that need NASA inputs, recommendation and/or decisions
- xxiv. Trade studies to be completed by SIR are defined and action plans are in place
- xxv. Updates to technical, cost, schedule, and safety risks and associated mitigation strategies/options
- xxvi. Summary of IMS, SRA, Critical Path, and NASA Integration activities consistent with current monthly deliverable of *Integrated Program Management Data Analysis Report (IPMDAR) (DRD USDV-7)*

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- xxvii. Updated Life-Cycle costs
2. CDR Data Products Delivered:
- i. Initial *USDV Launch Site Integration Plan (LSIP)* (**DRD USDV-40**)
 - ii. Initial *USDV Launch Commit Criteria (LCC)* (**DRD USDV-42**)
 - iii. Initial *USDV GNC Models and Data* (**DRD USDV-45**), Part B
 - iv. Final *Imagery Plan* (**DRD USDV-28**)
 - v. Final *USDV Transportation and Logistics Requirements Plan* (**DRD USDV-29**)
 - vi. Final *Data Input for NASA Integration and Independent Verification and Validation (IV&V)* (**DRD USDV-31**)
 - vii. Final *Models and Simulation Plan* (**DRD USDV-39**)
 - viii. Final *Verification and Validation Plan* (**DRD USDV-26**)
 - ix. Final *USDV GNC Models and Data* (**DRD USDV-45**), Part A
 - x. Updates to *TRL Assessment and Technology Maturation Plan* (**DRD USDV-23**)
 - xi. Update *USDV Spacecraft Readiness Plan* (**DRD USDV-30**)
 - xii. Update *Assembly, Integration and Test (AI&T) Plan* (**DRD USDV-32**)
 - xiii. Update *Command and Telemetry Dictionary* (**DRD USDV-37**)
 - xiv. Update *Operations Data Book* (**DRD USDV-38**)
 - xv. Update *Qualification and Acceptance Plan* (**DRD USDV-44**)
 - xvi. Mass Properties in accordance with *Mass Properties Report* (**DRD USDV-34**)
 - xvii. CAD models in accordance with *Engineering Computer-Aided Design (CAD) Models* (**DRD USDV-35**)
 - xviii. Final *Specification for USDV Hardware In The Loop Test Bed* (**DRD USDV-46**)
 - xix. Final *Specification for USDV SDIL Simulator for ISS integration testing* (**DRD USDV-47**)
 - xx. Interim USDV SDIL Simulator (reference SOW 2.9.6.b.9)
3. CDR Jointly Developed Products and Related Activities: The Contractor shall perform activities, support reviews, follow processes, and provide products in accordance with SSP 51105, *U.S. Deorbit Vehicle Integration Plan*, and for this Review:
- i. Interface requirements planning:
 - a) Baseline USDV-to-ISS ICD

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- b) Baseline USDV Software ICD
 - c) Baseline IP&CL
 - d) Baseline USDV-to-Ground ICD
 - e) Baseline USDV Training Simulator to NASA MTC ICD
 - f) Baseline SDIL to USDV SDIL Simulator ICD
 - g) Draft USDV-to-LV ICD
 - h) Verification Planning for interface requirements in the USDV SRD jointly approved by NASA and the Contractor technical team
 - i) Verification planning for LV interface requirements
- ii. Baseline JIVTP
 - iii. Update BDEALS
 - iv. Update BHSEALS
 - v. Updated Integrated Vehicle Performance analysis results, e.g.,
 - a) Structural/dynamics
 - b) Rendezvous and thruster firing analysis
 - c) Propulsion Analysis
 - d) Communication analysis
 - e) Contamination analysis
 - f) Controllability analysis
 - vi. Phase II Safety Review data has been delivered, reviewed, and approved per *Safety Data Package (DRD USDV-21)*
 - a) All single point failures are addressed in the HA
 - b) Hazard causes, controls, and verification methods are approved by the ISRP
 - c) Updates to S&MA approach (e.g., safety, reliability, maintainability, and quality assurance) has been adequately addressed in designs and any applicable S&MA products (e.g., system safety analysis, reliability analysis) have been approved
 - d) Non-compliance reports with acceptance rationale are reviewed by the ISRP
 - e) Updated list of hazardous commands
 - f) Updated CBCS matrix and software architecture
 - vii. Initial *Post Dock Assessment (Plan, Part A only) (DRD USDV-43)*
- f. CDR will be complete, and CLIN 1 closed, upon completion of the following:

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1. All DRDs for which delivery is required prior to and including CDR have been delivered; the requirements of the Data Item Descriptions (DIDs) have been met; and the CO has approved the DRDs that require government approval.
2. The Contractor has met all requirements of CDR in accordance with SOW *Section 3.10 Critical Design Review (CDR)* sections a-e, the CDR JIP, and the *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*.
3. Closure plans for CDR Action Items and RIDs/RFAs have been developed and agreed to by the Government. CLIN 1 will be considered closed upon the Government's agreement to this closure plan, which approval will not be unreasonably withheld. Completion of forward actions identified in CLIN 1 will be performed in CLIN 2.

4.0 PRODUCTION, ASSEMBLY, INTEGRATION AND TEST (CLIN 2)

CLIN 2 includes scope needed to complete production, assembly, integration, test, qualification, and certification efforts to accept the USDV. If CLIN 2 is CPIF, the C2 Milestones will be Project Lifecycle Reviews and shall be completed in accordance with the associated Work Plan in Attachment J-30, Work Plans.

4.1 GENERAL REQUIREMENTS

- a. The Contractor shall manufacture, assemble, integrate, test, and deliver the USDV in accordance with SSP 51101, *U.S. Deorbit Vehicle Systems Requirements Document*.
- b. The contractor shall perform interface testing, including testing for the ISS interface, NASA Mission Systems interface, and LV interface.
- c. The Contractor shall deliver final verification products.
- d. The Contractor shall provide subject matter expertise, data inputs, analysis, and product deliveries to support LV integration including:
 1. The Contractor shall perform all systems analyses and engineering to define all aspects of the USDV-to-LV interface.
 2. The Contractor shall provide technical support and USDV inputs required to develop the USDV-to-LV ICD. The USDV-to-LV ICD will be developed and maintained by the LV Contractor.
 3. The Contractor shall document USDV testing and inspection to be accomplished at the launch site in the ICD.
 4. The Contractor shall provide support for all activities associated with USDV to LV integration. This includes but is not limited to: ICD and Launch Site Support Plan (LSSP) verification, and integrated USDV/LV test plan and procedure development.
 5. The Contractor shall provide technical support, USDV data inputs, and evaluate results for the Mission Specific Analyses as part of USDV-to-LV ICD development. The Mission Specific Analyses will be developed by the LV Contractor. The Mission Specific Analyses will include but are not limited to:

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- i. Preliminary Mission Analysis
 - ii. Detailed Test Objectives
 - iii. Performance and Guidance Accuracy Analysis
 - iv. Trajectory Analysis
 - v. Payload Fairing Venting Analysis
 - vi. RF Compatibility Analysis
 - vii. RF Link Analysis
 - viii. Spacecraft Separation Analysis
 - ix. Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC) Analysis
 - x. LV Payload Fairing Critical Clearance Analysis
 - xi. Coupled Loads Analysis, and Integrated Thermal Analysis.
- e. The Contractor shall provide flight operations preparation including:
- 1. The Contractor shall develop, deliver, and provide sustaining engineering support for a configuration controlled USDV Training Simulator to be used by the flight operations teams to train operators, troubleshoot anomalies, verify, and test Operational Products, and maintain operator proficiencies in accordance with the *Models and Simulation Plan (DRD USDV-39)* and JSC-35194, *MTC Training Center Generic Simulation Interface Specification*.
 - 2. The Contractor shall attend Mission Systems working group meetings and provide technical input and status on the development of the USDV Training Simulator and the USDV Training Simulator to NASA Training Facility ICD.
 - 3. The Contractor shall update the Operations Data Book (ODB) in accordance with *Operations Data Book (DRD USDV-38)* to reflect updates to vehicle systems, flight design, and analysis data for the USDV Flight System.
 - 4. The Contractor shall update telemetry, commands, and other data link information in accordance with the *Command and Telemetry Dictionary (DRD USDV-37)*.
 - 5. The Contractor shall provide flight operations support in accordance with Section 2.15 *Flight Operations*.
- f. The Contractor shall provide technical support and subject matter expertise during incorporation of the models and data delivered in accordance with *USDV GNC Models and Data (DRD USDV-45)* into Station/Orbiter Multibody Berthing Analysis Tool (SOMBAT) to answer/address technical questions.

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4.2 MILESTONE C2-2 SYSTEM INTEGRATION

Milestone C2-2 includes scope for the SIR, manufacture, assembly, integration, and test of the USDV in preparation for system acceptance, and continuation of LV integration preparation, flight operations preparation, and simulator/HITL development.

4.2.1 LAUNCH VEHICLE INTEGRATION

- a. The Contractor shall prepare and deliver all Launch Site test procedures, plus updates and revisions, in accordance with *Launch Site Integration and Test (I&T) Procedures (DRD USDV-41)*.
- b. The Contractor shall prepare and deliver a Launch Site Integration Plan (LSIP), in accordance with *Launch Site Integration Plan (LSIP) (DRD USDV-40)*.
- c. The Contractor shall provide technical support and USDV data required to develop the LSIRD. The LSIRD will be developed and maintained by NASA.
- d. The Contractor shall provide LV integration support in accordance with Section 4.1.d *General Requirements*.

4.2.2 FLIGHT OPERATIONS PREPARATION

- a. The Contractor shall provide flight operations preparation support in accordance with Section 4.1.e *General Requirements*.

4.2.3 AVIONICS & SOFTWARE SIMULATION AND TEST FINALIZATION

USDV Avionics & Software Simulation and Test Finalization is the final test preparation readiness review of the HITL Test Bed and the USDV SDIL Simulator for ISS integration testing, to ensure readiness to start the integration and test campaigns.

- a. The Contractor shall finalize development of the HITL Test Bed.
- b. The Contractor shall transfer the final USDV SDIL Simulator by SIR to NASA for its use until contract close-out.
- c. The Contractor shall prepare and deliver a status of the test readiness including but not limited to, a list of any test bed issues, schedule challenges, deltas from the final Specification for USDV HITL Test Bed in accordance with *Specification for USDV Avionics and Software/Hardware-In-The-Loop (HITL) Test Bed (DRD USDV-46)*.
- d. The Contractor shall prepare and deliver a status of the test readiness including but not limited to, a list of any USDV SDIL Simulator issues, schedule challenges, deltas from the final Specification for USDV SDIL Simulator for ISS integration testing in accordance with *Specification for USDV SDIL Simulator for ISS Integration Testing (DRD USDV-47)*.
- e. The Contractor shall develop and lead, with NASA as an approving co-chair, a USDV Avionics & Software Simulation and Test Bed Readiness and Finalization review prior to the SIR. The review will consider the Test bed requirements outlined in SOW 2.9.6 *Test Facility Capability* and plan readiness status of software and test labs (including any non-compliances such as test bed/sim issues, test-as-you-operate exceptions, gaps in test bed fidelity, schedule problems compared to the verification test campaign plan, ship-short hardware, etc.) to proceed to the SIR.

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4.2.4 SYSTEM INTEGRATION REVIEW (SIR)

The purpose of the SIR is to ensure components and subsystems are on schedule to be integrated into the USDV, and integration facilities, support personnel are trained, and integration plans and procedures are on schedule to support integration. Readiness for integrated testing is reviewed.

- a. The Contractor shall organize, develop products for, and lead, with NASA as an approving co-chair, a USDV SIR to assess the progress towards meeting the USDV requirements.
- b. The Contractor shall demonstrate integration plans and procedures are on track for completion and approval to support system integration. The Contractor shall demonstrate component, subsystem, and system test results form a satisfactory basis for proceeding to integration. The Contractor shall demonstrate integration plans and procedures are on track for completion and approval to support system integration. The Contractor shall demonstrate the integration plans, as well as the procedures, environment, and configuration of the items to be integrated, provides a reasonable expectation that the integration will proceed successfully. The Contractor shall demonstrate all training necessary to properly integrate the system has been performed. The Contractor shall demonstrate that technical planning is sufficient to proceed to the next phase and includes planning for hardware, software, human systems, and data deliverables. The Contractor shall demonstrate that risks have been identified and mitigated to acceptable level.
- c. The Contractor shall prepare, jointly with NASA, and deliver for NASA review, feedback, and concurrence, an SIR JIP in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*.
- d. The Contractor shall present, deliver, and demonstrate the following content in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)* and the SIR JIP:
 1. SIR Data and Related Activities:
 - i. Closure of all CDR Action Items and RIDs/RFAs, including those from prior reviews, or a closure plan exists for those remaining open
 - ii. Integration plans and procedures have been completed and approved
 - iii. Components are available for integration at the next higher assembly
 - iv. All functional, unit-level, subsystem, and qualification testing has been conducted successfully or is on track to be conducted prior to schedule integration
 - v. Initial V&V results from lower tier products have been verified
 - vi. Mechanical and electrical interfaces have been verified against the interface control documentation
 - vii. Technical performance status related to margins, comparison of actual versus predicted margin for TPMs, resolution of the previous review discrepancies addressing effectiveness of technical achievement and communicating the overall risk to the project

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- viii. Successful completion of USDV Avionics & Software Simulation and Test Bed Readiness and Finalization Review
 - ix. Engineering model testing for risk reduction is complete
 - x. Dimensional analysis and fit checks have been conducted successfully
 - xi. Integration facilities, including clean rooms, ground support equipment, handling fixtures, overhead cranes, and electrical test equipment, are ready and available
 - xii. Support personnel have been adequately trained
 - xiii. The quality control organization is ready to support the integration effort
 - xiv. Handling and safety requirements have been documented
 - xv. Status of LV Integration preparation, including confirmation of delivery of final launch site I&T procedures and the LSIP
 - xvi. Status on development of operational products, training, and USDV Training Simulator
 - xvii. All known system discrepancies have been identified and dispositioned in accordance with an agreed-upon plan
 - xviii. Status of Long Lead Parts procurement, including outstanding and completed
 - xix. Summary of IMS, SRA, Critical Path, and NASA Integration activities consistent with current monthly deliverable of *Integrated Program Management Data Analysis Report (IPMDAR) (DRD USDV-7)*
2. SIR Data Products Delivered:
- i. Update *Verification and Validation Plan (DRD USDV-26)*
 - ii. Update *Assembly, Integration and Test (AI&T) Plan (DRD USDV-32)*
 - iii. Update *Qualification and Acceptance Plan (DRD USDV-44)*
 - iv. Update *USDV GNC Models and Data (DRD USDV-45)*
 - v. Final *Launch Site Integration and Test (I&T) Procedures (DRD USDV-41)*
 - vi. Final *Launch Site Integration Plan (LSIP) (DRD USDV-40)*
3. SIR Jointly Developed Products and Related Activities: The Contractor shall perform activities, support reviews, follow processes, and provide products in accordance with SSP 51105, *U.S. Deorbit Vehicle Integration Plan*.

4.3 MILESTONE C2-3 AI&T PROGRESS

Milestone C2-3 includes scope for the APR at SAR-12 months, continuation of the manufacture, assembly, integration, and test of the USDV in preparation for system acceptance, and

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continuation of LV integration preparation, flight operations preparation, and simulator/HITL development.

4.3.1 LAUNCH VEHICLE INTEGRATION

- a. The Contractor shall provide updates, as necessary, to Launch Site test procedures, plus updates and revisions, in accordance with *Launch Site Integration and Test (I&T) Procedures (DRD USDV-41)*.
- b. The Contractor shall provide updates, as necessary, to the LSIP, in accordance with *Launch Site Integration Plan (LSIP) (DRD USDV-40)*.
- c. The Contractor shall provide technical support and USDV data required to develop launch base requirements, which include but are not limited to the (LSSP). The LSSP will be developed and maintained by NASA and will define USDV support requirements for launch base processing activities.
- d. The Contractor shall provide LV integration support in accordance with Section 4.1.d *General Requirements*.

4.3.2 FLIGHT OPERATIONS PREPARATION

- a. The Contractor shall deliver an interim version of the USDV Training Simulator by SAR-18 months to be used by the flight operations teams to train operators, verify, and test Operational Products, and maintain operator proficiencies in accordance with the *Models and Simulation Plan (DRD USDV-39)* and JSC-35194, *MTC Training Center Generic Simulation Interface Specification*. The interim version of the USDV Training Simulator Model shall be delivered to the NASA MTC to aid in integration efforts, with additional updates at a frequency and fidelity defined to support training readiness and design maturation.
- b. The Contractor shall develop, provide, and maintain the procedures for USDV nominal/off-nominal operations, maintenance, and nominal/off-nominal time critical response in accordance with Flight Operations Review (FOR) Data Package (**DRD USDV-48**), SSP 50252, *Operations Data File Standards*, JSC 36054, *Systems Operation Data File Management*, and SSP 50254, *Operational Nomenclature*. The Contractor shall develop and provide procedure inputs to NASA FOD for ISS/USDV integrated procedures required to execute the USDV mission.
- c. The Contractor shall develop any console tools and displays needed beyond the NASA Flight Control Team (FCT) displays to support the necessary vehicle trending and engineering support functions required in the Mission Evaluation Room (MER).
- d. The Contractor shall provide flight operations preparation support in accordance with Section 4.1.e, *General Requirements*.

4.3.3 ASSEMBLY, INTEGRATION, AND TEST PROGRESS REVIEW (APR)

The purpose of the APR is to confirm acceptance date and all required tasks leading up to acceptance including, but not limited to, delta hardware, software, ground testing, training, and mission analyses. APR shall assess readiness to begin vehicle-level powered operations, progress through the assembly, integration and test phase, and status of lower-level qualification. APR is a progress review conducted between SIR and SAR and shall be conducted at SAR-12 months.

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- a. The Contractor shall organize, develop products for, and lead, with NASA as an approving co-chair, a USDV APR, to assess the progress towards meeting the USDV requirements.
- b. The Contractor shall prepare, jointly with NASA, and deliver for NASA review, feedback, and concurrence, an APR JIP in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*.
- c. The Contractor shall present, deliver, and demonstrate the following content in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)* and the APR JIP:
 1. APR Data and Related Activities:
 - i. Closure of all Milestone C2-2 Action Items and RIDs, including those from prior reviews, or a closure plan exists for those remaining open
 - ii. Status of LV Integration preparation
 - iii. Status of development and inputs to flight operations and training products
 - iv. Confirmation of the delivery of the interim version of the USDV Training Simulator
 - v. Status of lower-level qualification, including completion of qualification that can be completed prior to integration into the USDV System
 - vi. Preflown Hardware
 - a) Primary and backup hardware assigned for USDV including serial numbers, pedigree, maintenance history, and maintenance and refurbishment plan
 - b) Scope of hardware maintenance; hardware configuration; current status of hardware; remaining qualified service life of critical flight hardware; significant issues, significant engineering changes, and applicable risks uncovered or addressed during maintenance campaign at the time of review
 - vii. HITL and USDV SDIL Simulator test progress, issues, and schedule
 - viii. Status on progress of assembly, integration, and test of the USDV System
 - ix. Readiness and forward schedule to begin vehicle-level powered operations
 - x. Readiness and schedule to proceed to launch or dwell
 - xi. Summary of IMS, SRA, Critical Path, and NASA Integration activities consistent with current monthly deliverable of *Integrated Program Management Data Analysis Report (IPMDAR) (DRD USDV-7)*
 - xii. Update *USDV GNC Models and Data (DRD USDV-45)*

4.4 MILESTONE C2-4 SYSTEM ACCEPTANCE

Milestone C2-4 includes scope for the Phase III Safety Review, FOR, SAR, completion of the manufacture, assembly, integration, and test of the USDV, completion of the test capability

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development, and continuation of LV integration preparation and flight operations preparation.

- a. The Contractor shall deliver the Final *USDV Acceptance Data (DRD USDV-36)*.
- b. The Contractor shall organize, develop products for, and present, with NASA as the approving chair, a Software Acceptance Review Board (SARB) to allow NASA to confirm that the USDV software design complies with functional and performance requirements, as demonstrated in verification, validation, and qualification evidence such that the USDV software has sufficient maturity to proceed to delivery to the launch site or into dwell if required.

4.4.1 LAUNCH VEHICLE INTEGRATION

- a. The Contractor shall deliver the Final *USDV Launch Commit Criteria (LCC) (DRD USDV-42)*.
- b. The Contractor shall provide updates, as necessary, to Launch Site test procedures, plus updates and revisions, in accordance with *Launch Site Integration and Test (I&T) Procedures (DRD USDV-41)*.
- c. The Contractor shall provide updates, as necessary, to the LSIP, in accordance with *Launch Site Integration Plan (LSIP) (DRD USDV-40)*.
- d. The Contractor shall provide technical support and USDV data required to develop launch base requirements, which include but are not limited to the LSSP. The LSSP will be developed and maintained by NASA and will define USDV support requirements for launch base processing activities.
- e. The Contractor shall provide LV integration support in accordance with Section 4.1.d *General Requirements*.

4.4.2 FLIGHT OPERATIONS PREPARATION

- a. The Contractor shall deliver the Final Command and Telemetry Dictionary (DRD USDV-37).
- b. The Contractor shall deliver the Final *Operations Data Book (DRD USDV-38)*.
- c. The Contractor shall deliver the final USDV Training Simulator by SAR – 6 months to be used by the flight operations teams to train operators, verify and test Operational (Ops) Products, and maintain operator proficiencies in accordance with the *Models and Simulation Plan (DRD USDV-39)* and JSC-35194, *MTC Training Center Generic Simulation Interface Specification*.
- d. The Contractor shall be responsible for training NASA personnel (“train the trainer”) to promote knowledge transfer of the USDV System, subsystems, and operations. The Contractor shall:
 1. Provide training to NASA personnel that cover all the USDV subsystems and basic operations of the USDV
 2. Provide a package of training presentations and handouts, which NASA can freely use and modify for future training
 3. With NASA input and coordination, assist in development of a Flight Controller /

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crew training plan

4. As requested, the Contractor provide ground personnel training sessions to cover overall vehicle systems and operations at the Contractor facility or NASA facility. The sessions shall be recorded for future reference.
- e. The Contractor shall develop and update any console tools and displays needed in the ISS MER beyond the NASA FCT displays to support the necessary vehicle trending and engineering support functions required in the MER.
- f. The Contractor shall provide subject matter expertise in support of the NASA Flight Operations Team’s development of displays used by Flight Operations Directorate (FOD) during USDV operations.
- g. The Contractor shall be responsible for reviewing and concurring with operational products and materials to ensure consistency with hazard assessment and USDV acceptance.
- h. The Contractor shall perform review and provide feedback to NASA of flight products and *Operational Interface Procedures (OIPs)*.
- i. The Contractor shall assess and provide recommendations regarding flight rule change requests and procedures change requests in accordance with JSC 12820, *ISS Generic Operational Flight Rules, Volume B, Appendix B – Change Control*, and OIP 5.2.1.1, *Operational Interface Procedures* respectively, to assure that changes are consistent with the USDV requirements, constraints, and capabilities.
- j. The Contractor shall provide procedure updates through Change Request process as defined in JSC-36054 Annex 2, *Systems Operation Data File Management* prior to mission execution, and per OIP 5.2.1.1, *Operational Interface Procedure* during mission execution.
- k. The Contractor shall work with NASA teams for updates and reviews to procedures. Updates to the delivered procedures and any additional procedures will be worked collaboratively by the Contractor and NASA.
- l. The Contractor shall participate in two joint simulation training events in support of the USDV mission. NASA will conduct the events from the NASA-JSC training facilities and MCC to perform integrated mission training. The Contractor shall support from the ISS MER consistent with support for planned major events.
- m. The Contractor shall become certified in select console positions to support real-time operations in the ISS MER.
- n. The Contractor shall provide flight operations preparation support in accordance with Section 4.1.e *General Requirements*.

4.4.3 PHASE III SAFETY REVIEW

- a. The Contractor shall conduct the Phase III Safety Review.
- b. The Contractor shall present, deliver, and demonstrate the following content in accordance with per *Safety Data Package (DRD USDV-21)*:
 1. Hazard reports with verification closures are approved by the ISRP

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2. All verification evidence (based on the NASA system requirements or derived by the safety process) have been reviewed by the ISRP prior to Phase III completion. Verifications that cannot be verified by Phase III shall be negotiated with the ISRP and are tracked and maintained on a Safety Verification Tracking Log (SVTL) that presents a status of verification closures with estimated completion dates per SSP 30599, *Safety Review Process*.
3. The SVTL is closed, and any open items are tracked as actions for the SORR
4. The *Flight Safety Certification ISS_OE_906* is signed

4.4.4 FLIGHT OPERATIONS REVIEW (FOR)

The FOR will be held approximately 6 months before the SAR and will include review of all operational products including procedures, flight rules, timelines, trajectories, launch commit criteria, and operations data books. The objective of the FOR is to ensure that all mission execution products are accurate and mature enough to support the start of integrated mission-specific ground control team training.

- a. NASA will lead the review, with Contractor participation.
- b. The Contractor shall participate and provide subject matter expertise to respond to issues and concerns at the FOR.
- c. The Contractor shall support operational product review and evaluate the content for consistency with the USDV design and operations and provide inputs prior to and as part of the FOR.
- d. The Contractor shall deliver and maintain procedures for USDV nominal/off-nominal operations, maintenance, and nominal/off-nominal time critical response in accordance with *FOR Data Package (DRD USDV-48)*, SSP 50252, *Operations Data File Standards*, JSC 36054, *Systems Operation Data File Management*, and SSP 50254, *Operational Nomenclature*. The Contractor shall develop and provide procedure inputs to NASA FOD for ISS/USDV integrated procedures required to execute the USDV mission.

4.4.5 SYSTEM ACCEPTANCE REVIEW (SAR)

The purpose of SAR is to confirm that the USDV has completed its design, production, verification, validation, and overall qualification demonstrating that it meets all performance, functional, and interface requirements to authorize its acceptance for delivery to the launch site.

- a. The Contractor shall jointly organize, develop products for, and conduct a Pre-SAR at SAR – 4 months to assess readiness and maturity of SAR criteria and data products, identify and assess risk of open work prior to entering SAR. The Pre-SAR assessment shall determine adjustments to the SAR JIP necessary to develop final closure plans for open work, obtain NASA approval of remaining waivers or NCRs, and determine risk of open work identified for the scheduled SAR. The Pre-SAR activities shall include a series of meetings, final site audits, data inspections, and presentation of items (e.g., waivers) to NASA approval boards.
- b. The Contractor shall organize, develop products for, and lead, with NASA as the approving chair, a USDV SAR to allow NASA to confirm that the USDV design and build complies with functional and performance requirements, as demonstrated in

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verification, validation, and qualification evidence such that the USDV has sufficient maturity to proceed to delivery to the launch site or into dwell if required.

- c. The Contractor shall demonstrate the required tests and analyses are complete and indicate that the USDV System will perform properly in the expected operational environment. The Contractor shall demonstrate the USDV System hardware, software, documentation, and associated products are complete and ready for acceptance. The Contractor shall demonstrate the USDV System meets the established acceptance criteria. The Contractor shall demonstrate the acceptance data package is complete and reflects the delivered USDV System. The USDV Software components meet NASA requirements. The Contractor shall demonstrate that technical planning is sufficient to proceed to the next phase (dwell or launch site integration). The Contractor shall demonstrate that risks have been identified and mitigated to acceptable level.
- d. The Contractor shall prepare, jointly with NASA, and deliver for NASA review, feedback, and concurrence, a SAR JIP in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)* and the SAR JIP.
- e. The Contractor shall present, deliver, and demonstrate the following content in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*:
 1. SAR Data and Related Activities:
 - i. Closure of all Milestone C2-2, C2-3, and C2-4 (prior to occurrence of SAR) Action Items and RID/RFAs, including those from prior reviews, or a closure plan and risk assessment has been performed and accepted for those remaining open
 - ii. Design changes that occurred after SIR
 - iii. Results of the lower-level qualification testing, including those conducted at the major suppliers
 - iv. Qualification rationale for the USDV system as a whole
 - v. Results of acceptance reviews of subsystems and major components
 - vi. Evidence that configurations used for acceptance have been reconciled with the design configuration
 - vii. Documentation that the USDV complies with established acceptance criteria
 - viii. Documentation that the USDV will perform properly in the expected operational environment
 - ix. Incremental tests required or conducted due to design or requirement changes since test initiation, and resolution of issues have been identified and submitted.
 - x. Operational controls, limitations, and constraints of USDV have been incorporated into the operational products
 - xi. Existing IT and cybersecurity threats, vulnerabilities or abnormalities that will be mitigated or transferred to NASA

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- xii. Analysis and test results validating the results in the VCNs
- xiii. VCNs and Verification Events (VEs) closed or deferred per agreement at the Pre-SAR to standard open beyond SAR, or low risk beyond SAR. High risk nonstandard open items require SAR board disposition.
- xiv. Updated risk assessment and mitigation, including assessment of any ship short or open work beyond SAR
- xv. All waivers, NCRs, major MRBs approved or pending
- xvi. All licenses and permits have been obtained
- xvii. Contractor has conducted an Integrated Avionics Test to validate performance and operations, which includes:
 - a) HITL test bed with flight-like hardware and software that includes
 - 1) All elements of the USDV avionics, software, and power management (power source and RF Communications may be simulated).
 - 2) Simulated sensor inputs according to modeling of operations and environment.
 - b) Perform test runs for:
 - 1) Nominal flight modes including free flight and ISS mated operations
 - 2) Off nominal modes including free flight and ISS mated operations and showing response/recover to simulated failures and interruptions by the USDV FDIR implementation
- xviii. Version Description Documents for all software
- xix. Required safety, shipping, handling, checkout, and operational plans and procedures
- xx. Completion status of data delivery and support for integrated Hazard Reports
- xxi. Completed the Phase III Safety review and received ISRP Chair signature of the Phase III Hazard Reports
- xxii. Completed the FOR
- xxiii. Completed and received approval at the SARB
- xxiv. Physical Configuration – The Contractor has conducted a review to ensure that the as-built USDV has been built in accordance with the design specifications and configuration requirements, as evidenced by acceptance records, manufacturing instructions, and rationale for any nonconformances, deviations, or waivers.
 - a) Evidence is in place that critical item inspections have been

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successfully performed.

- b) As-designed/As-Built reconciliation
- xxv. Preflown Hardware
 - a) Primary and backup hardware assigned for USDV, including serial numbers, pedigree, maintenance and refurbishment plan
 - b) Scope of hardware maintenance; hardware configuration; current status of hardware; remaining qualified service life of critical flight hardware; significant issues, significant engineering changes, and applicable risks uncovered or addressed during maintenance campaign at the time of review
- xxvi. If entering Dwell, preventative maintenance strategies, operational proficiency, critical skills retention, and required tasks to proceed to shipment to the launch site and mission execution
- xxvii. Completed planning for maintenance and sustaining
- xxviii. Readiness and schedule to proceed to launch or dwell
 - a) Completed plan for entering dwell, if applicable
 - b) Dwell products, facilities, GSE, and personnel are ready or are scheduled for completion prior to need date
- xxix. Completion status of ground processing and readiness to proceed
- xxx. Completion status of the USDV transportation configuration and plan
- xxxi. Status of LV Integration preparation and inputs to LV integration and test products
- xxxii. Status of development and inputs to flight operations and training products
- xxxiii. Completion of flight operations activities (simulations, training, etc.)
- xxxiv. Confirmation of the delivery of the final version of the USDV Training Simulator
- xxxv. Updates to technical, cost, schedule, and safety risks and associated mitigation strategies/options
- xxxvi. Summary of IMS, SRA, Critical Path, and NASA Integration activities consistent with current monthly deliverable of *Integrated Program Management Data Analysis Report (IPMDAR) (DRD USDV-7)*
- 2. SAR Data Products Delivered:
 - i. Final *USDV Launch Commit Criteria (LCC) (DRD USDV-42)*
 - ii. Final *USDV Acceptance Data (DRD USDV-36)*
 - iii. Final *Command and Telemetry Dictionary (DRD USDV-37)*
 - iv. Final *Operations Data Book (DRD USDV-38)*

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- v. Final *USDV GNC Models and Data (DRD USDV-45)* (SAR – 6 months)
 - vi. Update *USDV Spacecraft Readiness Plan (DRD USDV-30)*
 - vii. Mass Properties in accordance with *Mass Properties Report (DRD USDV-34)*
 - viii. CAD models in accordance with *Engineering Computer-Aided Design (CAD) Models (DRD USDV-35)*
 - ix. Verification Closure Notices in accordance with *Verification and Validation Plan (DRD USDV-26)* for all applicable requirements from SSP 51101, *U.S. Deorbit Vehicle Systems Requirements Document* except those that are delegated to be closed with a Certificate of Compliance. Any open VCNs are tracked as constraints to the SORR and will be evaluated to determine if they are a constraint to flight readiness.
3. SAR Jointly Developed Products and Related Activities: The Contractor shall perform activities, support reviews, follow processes, and provide products in accordance with SSP 51105, *U.S. Deorbit Vehicle Integration Plan*.
- i. Final *Post Dock Assessment (Plan, Part A only) (DRD USDV-43)*

4.5 MILESTONE C2-5 SHIPMENT TO ACCEPTANCE DESTINATION

Milestone C2-5 includes scope for shipment to the Acceptance Destination which is either the Dwell facility, if dwell is needed, or the Launch Site Payload Processing Facility (LS PPF), if proceeding directly to launch. Milestone C2-5 also includes associated pre-ship reviews, post-ship inspections, checkouts, and power-ups, and correction of issues that occurred during shipment.

- a. The Contractor shall deliver the USDV.

4.5.1 SHIPMENT TO ACCEPTANCE DESTINATION

- a. The Contractor shall perform all ground processing, including any maintenance, required in preparation for shipment to the Acceptance Destination. The Acceptance Destination is defined as the Dwell Facility, if proceeding into Dwell; or the Launch Site Payload Processing Facility (LS PPF) if proceeding directly to launch.
- b. The Contractor shall provide ground support equipment and any other hardware needed to process and transport the USDV between sites.
- c. The Contractor shall prepare, jointly with NASA, and deliver for NASA review, feedback, and concurrence, a PSR JIP in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*.
- d. The Contractor shall conduct a PSR, with NASA as an approving co-chair. The PSR verifies that the USDV is ready to proceed to shipment to the Acceptance Destination. The Contractor shall present, deliver, and demonstrate the following content in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)* and the PSR JIP:
 - 1. PSR Data and Related Activities:

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- i. Identification of open paper and plan for completion at the receiving site
- ii. Final joint testing using as-planned software releases and configurations
- iii. Status of USDV System and Subsystems, including any open work, closure plans, and shipping timelines.
- iv. Status of hardware qualifications
- v. Personnel performing the shipping, receiving, post-ship inspection, checkout and power-ups, and corrective actions are trained and certified
- vi. Status of completeness of all drawing specifications. Explain any drawings or specifications that are not complete.
- vii. Status of required analyses, their associated estimated closure dates, and any open issues
- viii. Completion status of hardware assembly and verification that hardware reflects the final completed drawings. Explain each discrepancy in the as-built hardware
- ix. Status of required tests, their completion or plans to complete, and any open issues
- x. Status of required documentation, including plans to provide any documents that are not complete
- xi. Status of VCN closure activity including identification of remaining open VCNs and schedule for closure
- xii. Problem/failure reports on the USDV hardware (including electrical and mechanical ground support equipment) or software, as well as on other equipment, which could affect it. Provide the plans for resolution.
- xiii. Assessment of any "red flag" problem/failure reports -- problems, residual risks, and actions taken to manage the risk of an in-flight occurrence.
- xiv. Waivers of product requirements, including the risk assessment associated with each
- xv. Confirmation of USDV transportation arrangements
- xvi. Confirmation of readiness of contractor provided GSE required for Dwell, if applicable
- xvii. Confirmation of readiness of contractor provided GSE required for LV integration
- xviii. Readiness of the hardware to enter Dwell, if applicable
- xix. Readiness of hardware to be integrated with the LV, including any contractor provided GSE
- xx. Readiness of testing to be performed at the Launch Site
- xxi. Readiness to ship hardware, including the readiness of USDV for

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- shipping, adequacy of shipping containers, shipping methods, shipping environment control, and monitoring
- xxii. Special instructions for item handling, testing, monitoring, and training
 - xxiii. Review plans for Contractor and NASA participation in ground processing, launch vehicle integration and test, and launch preparations after shipment
 - xxiv. Updates to technical, cost, schedule, and safety risks and associated mitigation strategies/options
 - xxv. Summary of IMS, SRA, Critical Path, and NASA Integration activities consistent with current monthly deliverable of *Integrated Program Management Data Analysis Report (IPMDAR) (DRD USDV-7)*
 - xxvi. PSR Jointly Developed Products and Related Activities: The Contractor shall perform activities, support reviews, follow processes, and provide products in accordance with SSP 51105, *U.S. Deorbit Vehicle Integration Plan*.
- e. The Contractor shall be responsible for safe transportation of the USDV, flight hardware, and ground hardware to the Acceptance Destination in accordance with the *USDV Transportation and Logistics Requirements Plan (DRD USDV-29)* document.
 - f. The Contractor with participation with NASA shall conduct an inspection, check-out, and limited power-up after USDV arrival inside the Acceptance Destination and report to NASA any issues, anomalies, and non-conformances and the corresponding dispositions.
 - g. The Contractor shall correct issues and perform mitigations due to issues, anomalies, and non-conformances that were identified in the post-shipment inspection, check-out, and limited power-up.
 - h. The Contractor shall provide evidence of completion of Section 4.5.1 *Shipment to Acceptance Destination e, f, and g*.

5.0 DWELL (CLIN 3)

CLIN 3 scope includes storing the USDV in the Dwell facility, reporting on the Dwell status at the quarterly PMR and conducting a Dwell Release Review.

- a. The Contractor shall provide a secure, controlled-access, bonded storage facility for USDV flight and associated GSE for dwell in accordance with AS9100, *Quality Management Systems Requirements for Aviation, Space, and Defense Organizations*. The Contractor shall allow for NASA personnel access to the facility.
- b. The Contractor shall maintain all contractor facilities contracted under this SOW and used for processing of flight hardware in an ISO Class 8 clean room in accordance with ISO 14644-1, *Cleanrooms and Associated Controlled Environments, Part 1: Classification of air cleanliness by particle concentration*.
- c. The Contractor shall store and maintain the USDV in a state of readiness for the time between Shipment to the Dwell facility and Shipment to the LS PPF, if dwell is required, and in accordance with *USDV Spacecraft Readiness Plan (DRD USDV-30)*.

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- d. The Contractor shall be responsible for safe transportation of the USDV, flight hardware, and ground hardware to the dwell facility the *USDV Transportation and Logistics Requirements Plan (DRD USDV-29)* document.
- e. The Contractor shall secure and control physical access to the dwell facility
- f. The Contractor shall perform inventory control validation and record keeping for USDV hardware in accordance with AS9100, *Quality Management Systems Requirements* standards.
- g. The Contractor shall adhere to all USDV procedures and standards for quality control in accordance with the *Safety and Mission Assurance (S&MA) Plan (USDV-20)*.
- h. The Contractor shall perform all preventative maintenance for hardware and software to maintain the USDV in a state of readiness that supports the mission.
- i. The Contractor shall perform post-delivery modifications to hardware and software to meet interface requirements and maintain the USDV in state of readiness that supports the mission.
- j. The Contractor shall perform reverification activities (i.e., testing or inspection) and provide updates to data deliveries (e.g., VCNs, DRDs, Hazard Reports, Data Item Description (DIDs)) of any components that have had corrective or preventative maintenance, or any changes made to the accepted vehicle post SAR.
- k. The Contractor shall maintain operations and sustaining engineering team proficiency and currency to perform work required in CLIN 3 and CLIN 4 and support an L-12 month launch call-up.
- l. The Contractor shall be responsible for providing all GSE required for the USDV dwell period unless otherwise agreed.
- m. Reserved.
- n. The Contractor shall sustain the HITL Test Bed to be used to perform hardware/software testing and verification in accordance with the *Specification for USDV Avionics and Software/Hardware-In-The-Loop Test Bed (DRD USDV-46)*.
- o. The Contractor shall sustain the USDV SDIL Simulator to be used to perform hardware/software testing and verification in accordance with the *Specification for USDV SDIL Simulator for ISS integration testing (DRD USDV-47)*.
- p. The Contractor shall report the dwell status at the PMRs when the USDV is in dwell. The Contractor shall report operations, activities, preventative and corrective maintenance, anomalies, issue resolution, overall health status of the USDV and other items of note at the PMRs during the dwell period in accordance with *Program Management Review (PMR) (DRD USDV-2)*.

5.1 DWELL RELEASE REVIEW (DRR)

- a. The Contractor shall prepare, jointly with NASA, and deliver for NASA review, feedback, and concurrence, a DRR JIP in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*.

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- b. The Contractor shall conduct a DRR at L-3 months, with NASA as an approving co-chair. The DRR verifies that the USDV is ready to be released from Dwell, enter the standard processing flow, and proceed to shipment to the Launch Site PPF. The Contractor shall present, deliver, and demonstrate the following content in accordance with *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)* and the DRR JIP:
1. DRR Data and Related Activities:
 - i. Identification of any hardware or software changes after SAR, including impact to USDV functionality and performance, if applicable
 - ii. Maintenance, testing, and inspection performed after SAR, including impact to USDV functionality and performance, if applicable
 - iii. Complete list of issues, anomalies, non-conformances, and the corresponding dispositions experienced following SAR, including impact to USDV functionality and performance, if applicable
 - iv. Status of operations and sustaining engineering team proficiency, currency, and certification
 - v. Status of required tests, their completion or plans to complete, and any open issues
 - vi. Status of required documentation, including plans to provide any documents that are not complete
 - vii. Status of VCN closure activity including identification of remaining open VCNs and schedule for closure
 - viii. Confirmation of USDV transportation arrangements
 - ix. Confirmation of readiness of contractor provided GSE required for LV integration
 - x. Readiness of hardware to be integrated with the LV, including any contractor provided GSE
 - xi. Readiness of testing to be performed at the Launch Site
 - xii. Personnel performing the shipping, receiving, post-ship inspection, checkout and power-ups, and corrective actions are trained and certified
 - xiii. Readiness to ship hardware from the Dwell facility to the Launch Site, including the readiness of USDV for shipping, adequacy of shipping containers, shipping methods, shipping environment control, and monitoring
 - xiv. Special instructions for item handling, testing, monitoring, and training
 - xv. Review plans for Contractor and NASA participation in ground processing, launch vehicle integration and test, and launch preparations after shipment
 - xvi. Updates to technical, cost, schedule, and safety risks and associated

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mitigation strategies/options

- xvii. Summary of IMS, SRA, Critical Path, and NASA Integration activities consistent with current monthly deliverable of *Integrated Program Management Data Analysis Report (IPMDAR) (DRD USDV-7)*
- 2. DRR Data Products Delivered:
 - i. Update *USDV Acceptance Data (DRD USDV-36)*
- 3. DRR Jointly Developed Products and Related Activities: The Contractor shall perform activities, support reviews, follow processes, and provide products in accordance with SSP 51105, *U.S. Deorbit Vehicle Integration Plan*.

6.0 LAUNCH VEHICLE INTEGRATION AND SUSTAINING (CLIN 4)

CLIN 4 includes scope for LV integration and sustaining engineering and operations including final LV integration and testing, pre-launch preparation, flight execution preparation, launch and flight operations, and procurement of hardware.

6.1 GENERAL REQUIREMENTS

- a. The Contractor shall perform software updates and re-verifications/re-validations from SAR through end of mission as follows:
 - 1. The Contractor shall prepare, validate, and perform, in conjunction with NASA, any needed updates to Software to accommodate late-breaking issues, day-of-flight configuration changes, other configuration changes, security flaws, bug fixes, and/or accommodating ISS software changes, in compliance with the defined software process (*Software Management Plan, DRD USDV-24*).
 - 2. The Contractor shall perform, in conjunction with NASA, any re-verification activities necessary to verify and validate software updates from USDV or ISS as deemed necessary by the ISS Avionics and Software Control Board, in compliance with the defined software process (*Software Management Plan, DRD USDV-24*).
 - 3. The Contractor shall deliver software updates to the ISS Mission Build Facility, in compliance with the defined software process (*Software Management Plan, DRD USDV-24*).
- b. The Contractor shall provide flight operations support throughout CLIN 4 including:
 - 1. The Contractor shall sustain the USDV Training Simulator to be used by the flight operations teams to train operators, troubleshoot anomalies, verify, and test Operational Products, and maintain operator proficiencies in accordance with the *Models and Simulation Plan (DRD USDV-39)* and JSC-35194, *MTC Training Center Generic Simulation Interface Specification*.
 - 2. The Contractor shall be responsible for reviewing and concurring with operational products and materials to ensure consistency with hazard assessments and USDV acceptance.

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3. The Contractor shall develop any console tools and displays for the ISS MER needed beyond the NASA FCT displays to support the necessary vehicle trending and engineering support functions required in the MER.
 4. The Contractor shall perform review and provide feedback to NASA of flight products and OIPs.
 5. The Contractor shall assess and provide recommendations regarding flight rule change requests and procedures change requests in accordance with JSC 12820, *ISS Generic Operational Flight Rules, Volume B, Appendix B – Change Control* and OIP 5.2.1.1, *Operational Interface Procedures* respectively, to assure that changes are consistent with the USDV requirements, constraints, and capabilities.
 6. The Contractor shall provide subject matter expertise in support of the NASA Flight Operations Team’s development of displays used by FOD during USDV operations.
 7. The Contractor shall provide procedure updates through Change Request process as defined in JSC-36054 Annex 2, *Systems Operation Data File Management* prior to mission execution, and per OIP 5.2.1.1, *Operational Interface Procedures* during mission execution.
 8. The Contractor shall work with NASA teams for updates and reviews to procedures. Updates to the delivered procedures and any additional procedures will be worked collaboratively by the Contractor and NASA.
 9. The Contractor shall update the ODB in accordance with *Operations Data Book (DRD USDV-38)* to reflect updates to vehicle systems, flight design, and analysis data for the USDV Flight System.
 10. The Contractor shall update telemetry, commands, and other data link information in accordance with the *Command and Telemetry Dictionary (DRD USDV-37)*.
 11. The Contractor shall provide data and subject matter expertise for Mission Specific Analyses, as required. These analyses may be affected by with specific launch windows, flight specific propellant usage profiles, phasing plans, thermal analyses, space weather, etc.
 12. The Contractor shall provide flight operations support in accordance with Section 2.15 Flight Operations.
- c. The Contractor shall provide subject matter expertise and technical data to support NASA’s compliance with NPR 8580.1, *NASA National Environmental Policy Act (NEPA) Management Requirements* and provide documentation and supporting rationale to NASA throughout the NEPA process, as required by the Contracting Officer.
 - d. The Contractor shall sustain the HITL Test Bed to be used to perform hardware/software testing and verification, support anomaly resolution, and evaluate configuration changes in accordance with the *Specification for USDV Avionics and Software/Hardware In The Loop Test Bed (DRD USDV-46)*.
 - e. The Contractor shall sustain the USDV SDIL Simulator to be used to perform hardware/software testing and verification, support anomaly resolution, and evaluate

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configuration changes in accordance with the *Specification for USDV SDIL Simulator for ISS integration testing (DRD USDV-47)*.

- f. The Contractor shall provide technical support and subject matter expertise during incorporation of the models and data delivered in accordance with *USDV GNC Models and Data (DRD USDV-45)* into SOMBAT to answer/address technical questions.

6.2 PRE-LAUNCH

The USDV pre-launch activities include USDV integration and testing with the LV, operational readiness reviews, launch operations preparation, and flight operations preparation.

6.2.1 GROUND SEGMENT

The Contractor shall provide definition and verification of the Ground Segment interfaces (e.g., data, video, telemetry, voice loop, etc.) by collaborating with NASA to develop the USDV-to-Ground ICD, and the LSP LSSP.

6.2.2 PRE-LAUNCH GROUND PROCESSING, INTEGRATION AND TEST

- a. The Contractor shall perform post-acceptance ground processing, testing, preventative maintenance, and corrective maintenance.
- b. The Contractor shall perform all ground processing, including any maintenance, required in preparation for transportation between facilities.
- c. The Contractor shall provide all ground support equipment (GSE) and any other hardware needed to process and transport the USDV between facilities.
- d. The Contractor shall be responsible for safe transportation of the USDV, flight hardware, and ground hardware between facilities in accordance with the *USDV Transportation and Logistics Requirements Plan (DRD USDV-29)* document.
- e. The Contractor shall conduct an inspection, check-out, and limited power-up after USDV arrival at a new facility and report to NASA any issues, anomalies, and non-conformances and the corresponding dispositions.
- f. The Contractor shall correct issues and perform mitigations due to issues, anomalies, and non-conformances that were identified in the post-transportation inspection, check-out, and limited power-up. The Contractor shall continue to perform these activities as issues, anomalies and non-conformances occur throughout the launch preparation phase.
- g. The Contractor shall perform USDV GSE set-up and maintenance at the launch site processing facilities.
- h. The Contractor shall perform post-ship testing of the USDV and associated USDV GSE and resolve all issues following shipment.
- i. The Contractor shall perform all USDV ground processing (hazardous and non-hazardous) including battery charging and high-pressure gas loading. The Contractor shall provide all monitoring displays and analysis tools required to perform the USDV ground processing, launch vehicle integration and testing.
- j. The Contractor shall provide all services associated with USDV System readiness in preparation for launch.

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- k. The Contractor shall monitor the USDV during transportation between sites at the Launch Site.
- l. The Contractor shall perform check-outs following USDV transportation between sites and integration with the Launch Vehicle.
- m. The Contractor shall provide support for all activities associated with USDV to LV integration. This includes, but is not limited to, ICD and LSSP verification, integrated USDV/LV test plan and procedure development, USDV to LV integration operations, ground processing facilities and GSE integration/readiness and launch support efforts.
- n. The Contractor shall provide technical support required to perform USDV to LV I&T, including the verification of all USDV-to-LV ICD requirements.
- o. The Contractor shall hold daily meetings with the launch-site team once the USDV has arrived at the launch site to discuss status, schedule, requests, and issues.
- p. The Contractor shall allocate and support 15 working days of dedicated USDV test during USDV/LV I&T at the Launch Site.
- q. The Contractor shall provide the personnel, procedures, and GSE required to perform USDV fueling and shall perform the actual USDV fueling at the NASA-provided launch site processing facility in accordance with NASA regulations and processes.
- r. The Contractor shall perform pre-launch testing; coordinate with LSP, ground stations, and the LV provider to perform pre-launch command and telemetry data flows with USDV.
- s. The Contractor shall perform Tracking and Data Relay Satellite live sky testing.
- t. The Contractor shall perform pad umbilical testing with NASA Mission Systems.
- u. NASA will procure launch services through NASA LSP.
- v. NASA will provide the LS PPF for USDV Launch Site I&T through the GFE Launch Services Contract.
- w. NASA will provide fuel, oxidizer, pressurant, and fueling support equipment through the GFE Launch Services Contract.
- x. NASA will provide the USDV to LV Mating Adapter and Separation System through the GFE Launch Services Contract.
- y. NASA will provide purge gases during launch processing through the GFE Launch Services Contract.

6.2.3 LAUNCH OPERATIONS PREPARATION

- a. The Contractor shall provide all resources to analyze, plan, perform, coordinate, and document all phases of launch operations for the USDV from arrival at the PPF through launch, including ground USDV servicing in the event of mission abort.
- b. The Contractor shall support launch site/countdown procedure development.

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- c. The Contractor shall provide personnel representing Systems Engineering and USDV I&T, at a minimum, at the Ground Operations Readiness Review (GORR) held at the Launch Site PPF.
- d. The Contractor shall support a one (1) day GORR.
- e. The Contractor shall provide personnel representing Systems Engineering and USDV I&T, at a minimum, at two (2) planned Ground Operations Working Group (GOWG) meetings held at the Launch Site.
- f. The Contractor shall support five (5), one (1) day GOWGs.
- g. The Contractor shall provide personnel representing Systems Engineering and USDV I&T, at a minimum, at planned Mission Integration Working Group (MIWG) meetings held at the Launch Site or at LV Contractor Facilities.
- h. The Contractor shall support four (4), one (1) day MIWGs.
- i. The Contractor shall provide personnel representing Systems Engineering and USDV I&T, at a minimum, at planned Mission Integration Team (MIT) meetings held via teleconference.
- j. The Contractor shall support monthly, one (1) hour MIT meetings.
- k. The Contractor shall perform pre-launch preparations to ready the USDV for launch.
- l. The Contractor shall support a minimum of three (3) Launch Countdown rehearsals, during launch site processing, which include the introduction of simulated anomalies, launch countdown abort, hold, and recycle events.
- m. The Contractor shall ensure the launch engineering team is present at the launch site for all pre-launch activities and to receive training and certification for launch operations.
- n. The Contractor shall participate in training and obtain certification for launch operations.
- o. The Contractor shall monitor the USDV LCC configuration for launch via real-time telemetry.
- p. The Contractor shall coordinate the USDV LCCs with the ISS Flight Operations Directorate (FOD) Team for mission operations-related criteria.
- q. The Contractor shall prepare and deliver the USDV Launch Commit Criteria (LCC), plus updates and revisions, in accordance with *USDV Launch Commit Criteria (LCC) (DRD USDV-42)*.
- r. The Contractor shall participate in two joint simulation training events with NASA FOD and LSP in support of the USDV launch. NASA will conduct the events from the NASA-JSC training facilities and MCC to perform integrated mission training. The Contractor shall support from the ISS MER consistent with support for planned major events.

6.2.4 FLIGHT OPERATIONS PREPARATION

Final flight operations preparation will occur post USDV acceptance leading up to launch. The culmination of these activities will produce updates to operations products and procedures necessary to execute the USDV mission.

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- a. The Contractor shall participate in three joint simulation training events in support of the USDV mission. NASA will conduct the events from the NASA-JSC training facilities and MCC to perform integrated mission training. The Contractor shall support from the ISS MER consistent with support for planned major events.
- b. The Contractor shall be certified in select console positions to support real-time operations in the ISS MER.
- c. The Contractor shall provide flight operations support in accordance with Section 2.15 Flight Operations.

6.2.5 DELTA FOR

The Delta FOR will be held approximately 6 months before the planned launch date and will include review of all operational products including procedures, flight rules, timelines, trajectories, launch commit criteria, and ODB. The objective of the Delta FOR is to provide an update on mission execution products since FOR and ensure that all mission execution products are accurate and mature enough to support the start of integrated mission-specific ground control team training, prior to FRR.

- a. NASA will lead the review, with Contractor participation.
- b. The Contractor shall participate and provide subject matter expertise to respond to issues and concerns at the Delta FOR.
- c. The Contractor shall support operational product review and evaluate the content for consistency with the USDV design and operations, and provide inputs prior to and as part of the Delta FOR.

6.2.6 POST VERIFICATION REVIEW (PVR)

The PVR will be held no later 2.5 months prior to launch at the ISS Transportation Integration Control Board (TICB). PVR will provide updates to verification compliance, including updates to verification and reverifications, following SAR in preparation for SORR. The PVR is the final milestone of a long-term verification coordination and execution process to establish requirement compliance by the NASA requirement owners. The board will review the results of VCN coordination and give a direction to forward work for screened findings and issues. Any open VCNs or action items will have a resolution plan and estimated closure date, which are nominally set for completion before SORR. The USDV Contractor is responsible for closing all open VCNs and action items by the dates identified at the PVR.

- a. NASA will lead the review, with Contractor participation.
- b. The Contractor shall participate and provide subject matter expertise and closure of open items from SAR, Shipment to Acceptance Destination, and DRR (if Dwell occurred) milestones at the PVR.
- c. The Contractor shall provide presentation materials as requested by NASA.

6.2.7 STAGE OPERATIONS READINESS REVIEW (SORR)

The SORR is a NASA ISS review where readiness for the launch and on-orbit operations of the USDV System is reviewed with emphasis on the USDV operations. A comprehensive review of any open work items is conducted and assessed for risk of proceeding with flight operations.

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This review encompasses readiness statuses from all NASA disciplines and the USDV Contractor. Any open items are tracked as constraints for the FRR.

- a. NASA will lead the review, with Contractor participation.
- b. The Contractor shall participate, provide subject matter expertise, and provide USDV Contractor CoFR endorsements at the SORR.
- c. The Contractor shall provide support to NASA in assessing risk of any open work associated with the USDV Operations, and presentation materials as requested by NASA.

6.2.8 FLIGHT READINESS REVIEW (FRR)

The NASA FRR is a NASA review where a final assessment of the readiness to proceed with the launch and operations is made. This review encompasses readiness statuses from all NASA disciplines and the USDV Contractor. Closure of open items from the SORR is assessed and any remaining issues are assessed for risk to flight operations.

- a. NASA will lead the review, with Contractor participation.
- b. The Contractor shall participate and provide subject matter expertise and closure of open items from the SORR at the NASA FRR.
- c. The Contractor shall provide presentation materials as requested by NASA.

6.2.9 LAUNCH READINESS REVIEW (LRR)

The NASA LRR is a NASA review where a final assessment of the launch vehicle readiness to proceed with the launch is made. This review encompasses readiness statuses from the launch vehicle provider, NASA and the USDV Contractor. Closure of open items from the FRR is assessed and any remaining issues are assessed for risk to flight operations.

- a. NASA will lead the review, with Contractor participation.
- b. The Contractor shall participate and provide subject matter expertise and closure of open items from the SORR at the NASA LRR.
- c. The Contractor shall provide presentation materials as requested by NASA.

6.3 LAUNCH AND FLIGHT OPERATIONS

The scope of operations includes real-time engineering support during launch, free flight, docking, mated operations, and deorbit operations. The scope also includes support for the DORR and post-mission support.

- a. NASA will operate the USDV from MCC-H (or Back-up Control Center (BCC)) for all phases of USDV real-time operations.
- b. The Contractor shall provide engineering technical support to the ISS MER and NASA flight control team for all phases of USDV real-time operations.

6.3.1 LAUNCH OPERATIONS

The Contractor shall support Launch from the launch site and the ISS MER at JSC in MCC-H.

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6.3.2 FLIGHT OPERATIONS

- a. NASA operations team will conduct real-time operations, with Contractor personnel providing on-console and off-console support during operations.
- b. The Contractor shall provide real-time engineering support with expertise across the entire USDV System to support operations.
- c. The Contractor shall provide real-time engineering support at the ISS MER in MCC-H or BCC for major on-orbit operations.
- d. The Contractor shall provide real-time engineering support at the Remote MER (e.g., contractor facilities) or ISS MER for non-critical operations and quiescent operations.
- e. The Contractor shall provide real-time engineering support including providing technical information, interpreting systems health data, and performing in-depth analysis in response to anomalous spacecraft conditions through the Mission Evaluation Team.
- f. The Contractor shall participate in three joint simulation training events in support of the USDV mission. NASA will conduct the events from the NASA-JSC training facilities and MCC to perform integrated mission training. The Contractor shall support from the ISS MER consistent with support for planned major events.
- g. The Contractor real-time engineering support personnel shall support the NASA System Managers and ISS MER Manager.
- h. The Contractor shall monitor, analyze, trend, and report the USDV hardware reliability and performance to determine actual vs. expected performance, anomalous behavior, and updates to the check out plans and operational procedures
- i. The Contractor shall immediately notify NASA of performance trends, which may have adverse impacts on planned future operations.
- j. The Contractor shall provide technical expertise and on-console support (e.g., MER), to respond to NASA flight controller questions and issues.
- k. The Contractor shall assess and respond to requests for information and analysis made to the ISS MER via the chit System.
- l. The Contractor shall provide support and technical expertise to respond to chits, flight notes, anomaly reports, items for investigation, real-time flight rule changes, and any anomalies or contingencies during all operations.
- m. The Contractor shall support real-time meetings (e.g., ISS Mission Management Team, Ops Tag, MER Readiness Reviews, Failure Investigation Teams, Anomaly Resolution Teams (ARTs,) Multilateral ARTs, Team 4).
- n. The Contractor shall ensure Original Equipment Manufacturer (OEM) reach back for resolution of real-time operations.
- o. The Contractor shall provide real-time engineering support in accordance with ISS Program Work Instruction OB-MER-006, *ISS MER Support Definition Document*, including:
 1. On-call 24 hour/365-day support for the USDV during quiescent operations,

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including response to pages from ISS MER Manager within 15 minutes of receipt

2. Report to the ISS MER in MCC-H or conduct Remote MER operations within 2 hours upon the request of the ISS MER Manager, during quiescent operations
3. Dedicated ISS MER support, including expertise covering the applicable USDV subsystems, in MCC-H and supplemented with Remote MER, if required, for major on-orbit activities conducted using the USDV as follows:
 - i. USDV Launch, orbit insertion, appendage deployments
 - ii. Initial Activation and Checkouts of all USDV subsystems, including any in-flight Demonstrations
 - iii. USDV Rendezvous and Docking to ISS
 - iv. Initial ISS translational maneuvers, initial ISS Debris Avoidance Maneuvers, initial ISS attitude control operations, and all ISS attitude control operations for Crew Docking and Undocking
 - v. Final de-orbit operations beginning with the orbit shaping burn(s) until final splashdown of the ISS is confirmed
- p. The Contractor shall deliver *Post Dock Assessment (Post Launch and Docking) (DRD USDV-43)*.
- q. The Contractor shall provide flight operations support in accordance with Section 2.15 *Flight Operations*.

6.3.3 DEORBIT READINESS REVIEW (DORR)

The DORR will be held approximately 1 month prior to the orbit shaping burn(s) and reentry burn. The DORR confirms the overall readiness to proceed with ISS deorbit. This review encompasses readiness statuses from all NASA and International Partner disciplines and the USDV Contractor. Closure of open items from the FRR are assessed, and any remaining issues are assessed for risk to flight operations.

- a. NASA will lead the review, with Contractor participation.
- b. The Contractor shall participate and provide subject matter expertise and closure of open items from all previous reviews at the DORR.
- c. The Contractor shall provide presentation materials as requested by NASA.

6.3.4 POST MISSION SUPPORT

The Contractor shall provide subject matter expertise, analysis, and input in response to NASA's development of post mission reports and lessons learned.

6.4 PARTS

The Contractor shall acquire, fabricate, test, qualify, configuration manage, maintain, and store parts, materials, and replacement units ordered by NASA.

7.0 SPECIAL TASKS AND STUDIES (CLIN 5)

The overall Objective of CLIN 5 is the performance of special tasks and studies necessary to

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perform activities that may be requested by NASA.

7.1 SPECIAL STUDIES (SUB-CLIN 5A)

The Contractor shall perform special studies and analyses, risk reduction activities, provide materials, and/or fabricate incidental hardware in support of this contract, as required. Each task will be initiated by written direction from the NASA CO. These tasks include advance planning and feasibility studies in support of future contemplated requirements; development, fabrication, and test of hardware/software to support planning studies or special tests, mission unique studies, material provision, and implementation of changes required due to changes in requirements.

7.2 PRE-PRICED EVALUATION OF NASA MISSION REQUIREMENTS (SUB-CLIN 5B)

- a. The Contractor shall perform studies and cooperate with NASA in evaluations for technology needs, risk reduction activities or the accommodation of NASA mission needs that does not specifically meet the criteria in SSP 51101, *U.S. Deorbit Vehicle System Requirements Document*, and related tasks or support. These studies and support may include the resolution of form, fit, and function questions; evaluation of flight specific environmental parameters (such as thermal, radiation, illumination, vibration, etc.) to ascertain the feasibility of accommodation; evaluation of non-standard or off-nominal processing requirements; feasibility evaluations of proposed requirement changes. Specific tasking will be assigned by the CO.
- b. The Contractor shall submit a deliverable during each PMR quarterly review detailing the special tasks and studies that were completed under Sub-CLIN 5B. The Sub-CLIN 5B deliverable shall be in the form of stand-alone written report(s), worksheet(s), or briefing charts, in the Contractor's standard format, accompanying an oral presentation, if required. If additional tasks are required after the execution of the task order, the COR and CO will coordinate accordingly with the Contractor to revise the task order to reflect the appropriate tier level per Sub-CLIN 5B only if the resulting sum of hours for that quarter exceeds the formally agreed-to tier. If the Contractor is unable to complete all tasks assigned for the applicable quarter, NASA reserves the right to withhold the amount associated with those tasks until they have been completed.

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SECTION D - PACKAGING AND MARKING

D.1 CLAUSES INCORPORATED BY REFERENCE

Clause(s) at the beginning of this Section are incorporated by reference, with the same force and effect as if they were given in full text. Clauses incorporated by reference which require a fill-in by the Government include the text of the affected paragraph(s) only. This does not limit the clause to the affected paragraph(s). The Contractor is responsible for understanding and complying with the entire clause.

The following contract clauses pertinent to this section are hereby incorporated by reference:

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)

CLAUSE NUMBER	DATE	TITLE
NONE		

II. NASA FAR SUPPLEMENT (48 CFR CHAPTER 18)

CLAUSE NUMBER	DATE	TITLE
1852.211-70	SEP 2005	PACKAGING, HANDLING, AND TRANSPORTATION
(End of Clauses Incorporated by Reference)		

D.2 NFS 1852.245-74 IDENTIFICATION AND MARKING OF GOVERNMENT EQUIPMENT. (JAN 2011)

(a) The Contractor shall identify all equipment to be delivered to the Government using NASA Technical Handbook (NASA-HDBK) 6003, Application of Data Matrix Identification Symbols to Aerospace Parts Using Direct Part Marking Methods/Techniques, and NASA Standard (NASA-STD) 6002, Applying Data Matrix Identification Symbols on Aerospace Parts or through the use of commercial marking techniques that: (1) are sufficiently durable to remain intact through the typical lifespan of the property; and, (2) contain the data and data format required by the standards. This requirement includes deliverable equipment listed in the schedule and other equipment when no longer required for contract performance and NASA directs physical transfer to NASA or a third party. The Contractor shall identify property in both machine and human readable form unless the use of a machine readable-only format is approved by the NASA Industrial Property Officer.

(b) Equipment shall be marked in a location that will be human readable, without disassembly or movement of the equipment, when the items are placed in service unless such placement would have a deleterious effect on safety or on the item's operation.

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(c) Concurrent with equipment delivery or transfer, the Contractor shall provide the following data in an electronic spreadsheet format:

- (1) Item Description.
- (2) Unique Identification Number (License Tag).
- (3) Unit Price.
- (4) An explanation of the data used to make the unique identification number.

(d) For equipment no longer needed for contract performance and physically transferred under paragraph (a) of this clause, the following additional data is required:

- (1) Date originally placed in service.
- (2) Item condition.

(e) The data required in paragraphs (c) and (d) of this clause shall be delivered to the NASA center receiving activity listed below:

NASA/Lyndon B. Johnson Space Center
Central Receiving, Bldg. 420
Recipient Mail Code: Name/Phone number:
Contract or Purchase Order #:
2101 NASA Parkway
Houston, TX 77058-3607

(f) The contractor shall include the substance of this clause, including this paragraph (f), in all subcontracts that require delivery of equipment.

(End of clause)
[END OF SECTION]

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SECTION E - INSPECTION AND ACCEPTANCE

E.1 LISTING OF CLAUSES INCORPORATED BY REFERENCE

Clause(s) at the beginning of this Section are incorporated by reference, with the same force and effect as if they were given in full text. Clauses incorporated by reference which require a fill-in by the Government include the text of the affected paragraph(s) only. This does not limit the clause to the affected paragraph(s). The Contractor is responsible for understanding and complying with the entire clause.

The following contract clauses pertinent to this section are hereby incorporated by reference:

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)

CLAUSE NUMBER	DATE	TITLE
52.246-2	AUG 1996	INSPECTION OF SUPPLIES - FIXED-PRICE <i>(Applies to FFP only)</i>
52.246-4	AUG 1996	INSPECTION OF SERVICES - FIXED-PRICE <i>(Applies to FFP only)</i>
52.246-7	AUG 1996	INSPECTION OF RESEARCH AND DEVELOPMENT - FIXED-PRICE <i>(Applies to FFP only)</i>
52.246-9	APR 1984	INSPECTION OF RESEARCH AND DEVELOPMENT (SHORT FORM)
52.246-15	APR 1984	CERTIFICATE OF CONFORMANCE
52.246-16	APR 1984	RESPONSIBILITY FOR SUPPLIES

II. NASA FAR SUPPLEMENT (48 CFR CHAPTER 18)

CLAUSE NUMBER	DATE	TITLE
1852.246-73	MAR 1997	HUMAN SPACE FLIGHT ITEM

(End of Clauses Incorporated by Reference)

E.2 FAR 52.246-11 HIGHER-LEVEL CONTRACT QUALITY REQUIREMENT (DEC 2014)

- (a) The Contractor shall comply with the higher-level quality standard(s) listed below.
- SAE Aerospace Quality Management System, AS9100.

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- Quality Management System – Requirements for Aviation, Space and Defense Organizations – Deliverable Software, AS9115.

Refer to Attachment J-05, *Applicable and Reference Documents List*, for version number.

(b) The Contractor shall include applicable requirements of the higher-level quality standard(s) listed in paragraph (a) of this clause and the requirement to flow down such standards, as applicable, to lower-tier subcontracts, in –

- (1) Any subcontract for critical and complex items (see 46.203(b) and (c)); or
- (2) When the technical requirements of a subcontract require -
 - (i) Control of such things as design, work operations, in-process control, testing, and inspection; or
 - (ii) Attention to such factors as organization, planning, work instructions, documentation control, and advanced metrology.

(End of clause)

E.3 NFS 1852.246-71 GOVERNMENT CONTRACT QUALITY ASSURANCE FUNCTIONS. (OCT 1988)

In accordance with the inspection clauses of this contract, the Government intends to perform the following functions at the locations indicated:

Item	Quality Assurance Function	Location
1	Perform surveillance, Product Assurance Action, Audits, Government mandatory inspections, process assessments, acceptance, procurement quality assurance and source inspections. Review and assessment of discrepancy reports, nonconformances, waivers, test preparation sheets, procedures, hazard reports, Failure Modes and Effects Analysis (FMEA).	JSC, KSC, Contractor's Facility(s), Subcontractor and Vendors' Facilities

(End of clause)

E.4 NFS 1852.246-72 MATERIAL INSPECTION AND RECEIVING REPORT. (APR 2015)

(a) At the time of each delivery to the Government under this contract, the Contractor shall prepare and furnish a *Material Inspection and Receiving Report* (DD Form 250 series). The form(s) shall be prepared and distributed as follows: one electronic copy.

(b) The Contractor shall prepare the DD Form 250 in accordance with NASA FAR Supplement 1846.6. The Contractor shall enclose the copies of the DD Form 250 in the package or seal them in a waterproof envelope, which shall be securely attached to the exterior of the package in the most protected location.

(c) When more than one package is involved in a shipment, the Contractor shall list on the DD Form 250, as additional information, the quantity of packages and the package numbers. The

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Contractor shall forward the DD Form 250 with the lowest numbered package of the shipment and print the words “CONTAINS DD FORM 250” on the package.

(End of clause)

**E.5 PRELIMINARY INSPECTION AT SOURCE AND FINAL INSPECTION
AND ACCEPTANCE AT DESTINATION**

Preliminary inspection for compliance with the contract specifications and requirements may be performed at origin by an authorized representative of the Government, and final inspection and acceptance will be performed by the CO or his/her authorized representative at the hardware/software acceptance destination.

USDV acceptance via DD-250 occurs at Acceptance Destination upon completion of both Milestone C2-4 System Acceptance, C2-5 Shipment to Acceptance Destination and all issues identified during the Government's final inspection are corrected and/or resolved.

(End of clause)

[END OF SECTION]

PART I – THE SCHEDULE**SECTION F - DELIVERIES OR PERFORMANCE****F.1 LISTING OF CLAUSES INCORPORATED BY REFERENCE**

Clause(s) at the beginning of this Section are incorporated by reference, with the same force and effect as if they were given in full text. Clauses incorporated by reference which require a fill-in by the Government include the text of the affected paragraph(s) only. This does not limit the clause to the affected paragraph(s). The Contractor is responsible for understanding and complying with the entire clause.

The following contract clauses pertinent to this section are hereby incorporated by reference:

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)

CLAUSE NUMBER	DATE	TITLE
52.242-15	AUG 1989	STOP-WORK ORDER (<i>Applies to FFP only</i>)
52.242-17	APR 1984	GOVERNMENT DELAY OF WORK (<i>Applies to FFP only</i>)
52.247-34	NOV 1991	F.O.B. DESTINATION
52.247-55	JUN 2003	F.O.B. POINT FOR DELIVERY OF GOVERNMENT-FURNISHED PROPERTY

II. NASA FAR SUPPLEMENT (48 CFR CHAPTER 18)

CLAUSE NUMBER	DATE	TITLE
NONE		

(End of Clauses Incorporated by Reference)

F.2 COMPLETION OF WORK

All work required under this contract, including submission of all reports, shall be completed on or before:

- a) CLIN 1 DDT&E through CDR per the Attachment J-30, *Work Plan*
- b) CLIN 2 PRODUCTION, ASSEMBLY, INTEGRATION AND TEST refer to Clause F.3 52.211-9, DESIRED AND REQUIRED TIME OF DELIVERY
- c) CLIN 3-5 IDIQ refer to IDIQ clauses I.4 FAR 52.216-18 Ordering

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F.3 FAR 52.211-9 DESIRED AND REQUIRED TIME OF DELIVERY (JUN 1997)

(a) The Government desires delivery to be made according to the following schedule:

Desired Delivery Date:

Completion of both Milestone C.2-4 System Acceptance and Milestone C.2-5 Shipment to Acceptance Destination: August 1, 2028

Assumes required to launch December 1, 2028

If the offeror is unable to meet the desired delivery schedule, it may, without prejudicing evaluation of its offer, propose a delivery schedule below. However, the offeror's proposed delivery schedule must not extend the delivery period beyond the time for delivery in the Government's required delivery schedule as follows:

Required Delivery Date:

Completion of both Milestone C.2-4 System Acceptance and Milestone C.2-5 Shipment to Acceptance Destination: May 1, 2029

Assumes required to launch September 1, 2029

Offers that propose delivery of a quantity under such terms or conditions that delivery will not clearly fall within the applicable required delivery period specified above, will be considered nonresponsive and rejected. If the offeror proposes no other delivery schedule, the desired delivery schedule above will apply.

Offeror's Proposed Delivery Schedule:

Completion of both Milestone C.2-4 System Acceptance and Milestone C.2-5 Shipment to Acceptance Destination:

██████████

(b) Attention is directed to the Contract Award provision of the solicitation that provides that a written award or acceptance of offer mailed or otherwise furnished to the successful offeror results in a binding contract. The Government will mail or otherwise furnish to the offeror an award or notice of award not later than the day the award is dated. Therefore, the offeror shall compute the time available for performance beginning with the actual date of award, rather than the date the written notice of award is received from the Contracting Officer through the ordinary mails. However, the Government will evaluate an offer that proposes delivery based on the Contractor's date of receipt of the contract or notice of award by adding (1) five calendar days for delivery of the award through the ordinary mails, or (2) one working day if the solicitation states that the contract or notice of award will be transmitted electronically. (The term "working day" excludes weekends and U.S. Federal holidays.) If, as so computed, the offered delivery date is later than the required delivery date, the offer will be considered nonresponsive and rejected.

(End of clause)

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F.4 PLACE OF PERFORMANCE

The principal place of performance shall be 1 Rocket Rd. Hawthorne, California 90250.
(End of clause)

F.5 NFS 1852.247-72 ADVANCE NOTICE OF SHIPMENT. (OCT 1988)

Thirty (30) work days prior to shipping item(s): United States Deorbit Vehicle, ground hardware, and flight hardware, the Contractor shall furnish the anticipated shipment date, bill of lading number (if applicable), and carrier identity to the NASA USDV Project Manager, Contracting Officer Representative, and to the Contracting Officer.
(End of clause)

F.6 JSC 52.247-95 FLIGHT ITEM (JUN 2020)

Block 16 of each Department of Defense Form 250 prepared for flight hardware or related equipment to be shipped under this contract must be annotated as follows:

‘THIS IS A FLIGHT ITEM: OR “THIS IS MISSION ESSENTIAL GROUND SUPPORT EQUIPMENT,” as applicable.

(End of clause)

F.7 OPTION TO EXTEND

The Government may require the contractor to continue to perform services under this contract. The Contracting Officer may exercise this option by issuance of a unilateral contract modification 30 days or more before the ordering period end date stated in clause I.4, FAR 52.216-18 ORDERING. Should the option be exercised, the resultant contract will include all terms and conditions of the basic contract as it exists immediately prior to the exercise of the option, except for the following changes:

OPTION 1:

I.5 entitled “FAR 52.216-18 ORDERING” will be modified to state:

“(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from contract award through **September 30, 2031.**”

OPTION 2

I.5 entitled “FAR 52.216-18 ORDERING” will be modified to state:

“(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from contract award through **September 30, 2032.**”

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OPTION 3

I.5 entitled “FAR 52.216-18 ORDERING” will be modified to state:

“(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from contract award through **September 30, 2033.**”

OPTION 4

I.5 entitled “FAR 52.216-18 ORDERING” will be modified to state:

“(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from contract award through **September 30, 2034.**”

OPTION 5

I.5 entitled “FAR 52.216-18 ORDERING” will be modified to state:

“(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from contract award through **September 30, 2035.**”

(End of clause)

[END OF SECTION]

PART I – THE SCHEDULE**SECTION G - CONTRACT ADMINISTRATION DATA****G.1 LISTING OF CLAUSES INCORPORATED BY REFERENCE**

Clause(s) at the beginning of this Section are incorporated by reference, with the same force and effect as if they were given in full text. Clauses incorporated by reference, which require a fill-in by the Government include the text of the affected paragraph(s) only. This does not limit the clause to the affected paragraph(s). The Contractor is responsible for understanding and complying with the entire clause.

The following contract clauses pertinent to this section are hereby incorporated by reference:

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)

CLAUSE NUMBER NONE	DATE	TITLE
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II. NASA FAR SUPPLEMENT (48 CFR CHAPTER 18)

CLAUSE NUMBER	DATE	TITLE
1852.227-70	APR 2015	NEW TECHNOLOGY - OTHER THAN A SMALL BUSINESS FIRM OR NONPROFIT ORGANIZATION
1852.227-72	APR 2015	DESIGNATION OF NEW TECHNOLOGY REPRESENTATIVE AND PATENT REPRESENTATIVE
1852.242-71	DEC 1988	TRAVEL OUTSIDE OF THE UNITED STATES
1852.245-75	JAN 2011	PROPERTY MANAGEMENT CHANGES
1852.245-78	AUG 2015	PHYSICAL INVENTORY OF CAPITAL PERSONAL PROPERTY
1852.245-79	JAN 2011	RECORDS AND DISPOSITION REPORTS FOR GOVERNMENT PROPERTY WITH POTENTIAL HISTORIC OR SIGNIFICANT REAL VALUE

(End of Clauses Incorporated by Reference)

G.2 NFS 1852.232-80 SUBMISSION OF VOUCHERS FOR PAYMENT. (APR 2018)

(a) The designated payment office is the NASA Shared Services Center (NSSC) located at FMD Accounts Payable, Bldg. 1111, Jerry Hlass Road, Stennis Space Center, MS 39529.

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(b) Except for classified vouchers, the Contractor shall submit all vouchers and invoices using the steps described at NSSC's Vendor Payment information Web site at: <https://www.nssc.nasa.gov/vendorpayment>. Please contact the NSSC Customer Contact Center at 1-877-NSSC123 ([REDACTED]) with any additional questions or comments.

(c) Payment requests.

(1) The payment periods are stipulated in the payment clause(s) contained in this contract.

(2) Vouchers submitted under cost type contracts and invoices submitted under fixed-price contracts shall include the items delineated in FAR 32.905(b) supported by relevant back-up documentation. Back-up documentation shall include at a minimum, the following information:

(i) Vouchers.

(A) Breakdown of billed labor costs and associated contractor generated supporting documentation for billed direct labor costs to include rates used and number of hours incurred.

(B) Breakdown of billed other direct costs (ODCs) and associated contractor generated supporting documentation for billed ODCs.

(C) Indirect rate(s) used to calculate the amount of billed indirect expenses.

(D) Progress reports, as required.

(ii) Invoices.

(A) Description of goods and services delivered as part of the contract's terms and conditions, including the dates of delivery/performance.

(B) Progress reports, as required.

(C) Date goods and services were performed.

(iii) Fee vouchers.

(A) Listing of all provisionally-billed fee by period or date earned since contract award.

(B) A reconciliation of all billed and earned fee.

(C) A clear explanation of the fee calculations.

(d) *Non-electronic payment requests.* The Contractor may submit a non-electronic voucher/invoice using the steps for non-electronic payment requests described at <https://www.nssc.nasa.gov/vendorpayment>, when any of the following conditions are met:

(1) The Contracting Officer administering the contract for payment has determined, in writing, that electronic submission would be unduly burdensome to the Contractor.

(2) The contract includes provisions allowing the contractor to submit vouchers or invoices using the steps for non-electronic payment. In such instances the Contractor agrees to submit non-electronic payment requests using the method or methods specified in Section G of the contract.

(e) Improper vouchers/invoices. The NSSC Payment Office will notify the contractor of any apparent error, defect, or impropriety in a voucher/invoice within seven calendar days of receipt by the NSSC Payment Office. Inquiries regarding requests for payment should be directed to the NSSC as specified in paragraph (b) of this section.

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(f) *Other payment clauses.* In addition to the requirements of this clause, the Contractor shall meet the requirements of the appropriate payment clauses in this contract when submitting payment requests.

(g) In the event that amounts are withheld from payment in accordance with provisions of this contract, a separate payment request for the amount withheld will be required before payment for that amount may be made.

(End of clause)

G.3 NFS 1852.245-71 INSTALLATION—ACCOUNTABLE GOVERNMENT PROPERTY (JUN 2018)

(a) The Government property described in paragraph (c) of this clause may be made available to the Contractor on a no-charge basis for use in performance of this contract. This property shall be utilized only within the physical confines of the NASA installation that provided the property unless authorized by the Contracting Officer under (b)(1)(iv). Under this clause, the Government retains accountability for, and title to, the property, and the Contractor shall comply with the following:

1. NASA Procedural Requirements (NPR) 4100.1, NASA Materials Inventory Management Manual. NASA Procedural Requirements (NPR) 4200.1, NASA Equipment Management Procedural Requirements.
2. NASA Procedural Requirement (NPR) 4300.1, NASA Personal Property Disposal Procedural Requirements
3. NPR 4310.1 Artifact Identification and Disposition
4. JSC Procedural Requirement (JPR) 1281.7 Control of Customer Property
5. JPR 1281.15 Identification, Handling, Storage, Packaging, Preservation, and Delivery
6. JSC Work Instruction (JWI) 4200.1 Management of Controlled Equipment
7. JWI 4210.2 JSC Instructions for Control of Program Stock (formally JSC 26549)
8. JWI 4300.1 JSC Instructions for Excess and Disposal of Government Property
9. JWI 6050.1 Procedures for Processing Shipments from JSC

Property not recorded in NASA property systems must be managed in accordance with the requirements of the clause at FAR 52.245–1, as incorporated in this contract.

The Contractor shall establish and adhere to a system of written procedures to assure continued, effective management control and compliance with these user responsibilities. In accordance with FAR 52.245-1(h)(1) the contractor shall be liable for property lost, damaged, destroyed or stolen by the contractor or their employees when determined responsible by a NASA Property Survey Board, in accordance with the NASA guidance in this clause.

(b)(1) The official accountable recordkeeping, financial control, and reporting of the property subject to this clause shall be retained by the Government and accomplished within NASA management information systems prescribed by the installation Supply and Equipment Management Officer (SEMO) and Financial Management Officer. If this contract provides

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for the Contractor to acquire property, title to which will vest in the Government, the following additional procedures apply:

- (i) The Contractor's purchase order shall require the vendor to deliver the property to the installation central receiving area.
- (ii) The Contractor shall furnish a copy of each purchase order, prior to delivery by the vendor, to the installation central receiving area.
- (iii) The Contractor shall establish a record for Government titled property as required by FAR 52.245-1, as incorporated in this contract, and shall maintain that record until accountability is accepted by the Government.
- (iv) Contractor use of Government property at an off-site location and offsite subcontractor use requires advance approval of the Contracting Officer and notification of the Industrial Property Officer. The property shall be considered Government furnished and the Contractor shall assume accountability and financial reporting responsibility. The Contractor shall establish records and property control procedures and maintain the property in accordance with the requirements of FAR 52.245-1, Government Property (as incorporated in this contract), until its return to the installation. NASA Procedural Requirements related to property loans shall not apply to offsite use of property by contractors. After transfer of accountability to the Government, the Contractor shall continue to maintain such internal records as are necessary to execute the user responsibilities identified in paragraph (a) of this clause and document the acquisition, billing, and disposition of the property. These records and supporting documentation shall be made available, upon request, to the SEMO and any other authorized representatives of the Contracting Officer.

(c) The following property and services are provided if checked:

- (1) Office space, work area space, and utilities. Government telephones are available for official purposes only.
- (2) Office furniture.
- (3) Property listed in Attachment J-34, Installation Accountable Government Property
 - (i) If the Contractor acquires property, title to which vests in the Government pursuant to other provisions of this contract, this property also shall become accountable to the Government upon its entry into Government records.
 - (ii) The Contractor shall not bring to the installation for use under this contract any property owned or leased by the Contractor, or other property that the Contractor is accountable for under any other Government contract, without the Contracting Officer's prior written approval.
- (4) Supplies from stores stock.
- (5) Publications and blank forms stocked by the installation.
- (6) Safety and fire protection for Contractor personnel and facilities.
- (7) Installation service facilities: See Attachment J-34, *Installation Accountable Government Property*
- (8) Medical treatment of a first-aid nature for Contractor personnel injuries or illnesses sustained during on-site duty.
- (9) Cafeteria privileges for Contractor employees during normal operating hours.
- (10) Building maintenance for facilities occupied by Contractor personnel.
- (11) Moving and hauling for office moves, movement of large equipment, and delivery of supplies. Moving services may be provided on-site, as approved by the Contracting Officer.

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(End of clause)

G.4 NFS 1852.245-73 FINANCIAL REPORTING OF NASA PROPERTY IN THE CUSTODY OF CONTRACTORS. (JAN 2017)(Applies to CPIF only) (Applies to FFP if Contractor has custody of \$10 million dollars of Government Property)

(a) The Contractor shall submit annually a NASA Form (NF) 1018, *Electronic Submission System (NESS)* NASA Property in the Custody of Award Recipients, in accordance with this clause, the instructions on the form and NFS subpart 1845.71, and any supplemental instructions for the current reporting period issued by NASA.

(b)(1) Subcontractor use of NF 1018, *Electronic Submission System (NESS)* is not required by this clause; however, the Contractor shall include data on property in the possession of subcontractors in the annual NF 1018.

(2) The Contractor shall mail the original signed NF 1018, *Electronic Submission System (NESS)* directly to the cognizant NASA Center Industrial Property Officer and a copy to the cognizant NASA Center Deputy Chief Financial Officer, Finance, unless the Contractor uses the NF 1018, *Electronic Submission System (NESS)* for report preparation and submission.

(3) One copy shall be submitted (through the Department of Defense (DOD) Property Administrator if contract administration has been delegated to DOD) to the following address: Industrial Property Officer/JB3, NASA/Johnson Space Center, unless the Contractor uses the NF 1018, *Electronic Submission System (NESS)* for report preparation and submission.

(c)(1) The annual reporting period shall be from October 1 of each year through September 30 of the following year. The report shall be submitted in time to be received by October 31st. The information contained in these reports is entered into the NASA accounting system to reflect current asset values for agency financial statement purposes. Therefore, it is essential that required reports be received no later than October 31st.

(2) Some activity may be estimated for the month in which the report is submitted, if necessary, to ensure the NF 1018, *Electronic Submission System (NESS)* is received when due. However, contractors' procedures must document the process for developing these estimates based on planned activity such as planned purchases or NASA Form 533 (NF 533) Contractor Financial Management Report cost estimates. It should be supported and documented by historical experience or other corroborating evidence, and be retained in accordance with FAR Subpart 4.7, Contractor Records Retention. Contractors shall validate the reasonableness of the estimates and associated methodology by comparing them to the actual activity once that data is available and adjust them accordingly. In addition, differences between the estimated cost and actual cost must be adjusted during the next reporting period. Contractors shall have formal policies and procedures, which address the validation of NF 1018, *Electronic Submission System (NESS)* data, including data from subcontractors, and the identification and timely reporting of errors. The objective of this validation is to ensure that information reported is accurate and in compliance with the NASA FAR Supplement. If errors are discovered on NF 1018,

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Electronic Submission System (NESS) after submission, the contractor shall contact the cognizant NASA Center Industrial Property Officer (IPO) within 30 days after discovery of the error to discuss corrective action.

(3) In addition to an annual report, if at any time during performance of the contract, NASA-owned property in the custody of the contractor has a value of \$10 million or more, the contractor shall also submit a report no later than the 21st of each month in accordance with the requirements of paragraph (c)(2) of this clause.

(4) The Contracting Officer may, in NASA's interest, withhold payment until a reserve not exceeding \$25,000 or 5 percent of the amount of the contract, whichever is less, has been set aside, if the Contractor fails to submit annual NF 1018, *Electronic Submission System (NESS)* reports in accordance with NFS subpart 1845.71, any monthly report in accordance with (c)(3) of this clause, and any supplemental instructions for the current reporting period issued by NASA. Such reserve shall be withheld until the Contracting Officer has determined that NASA has received the required reports. The withholding of any amount or the subsequent payment thereof shall not be construed as a waiver of any Government right.

(d) A final report shall be submitted within 30 days after disposition of all property subject to reporting when the contract performance period is complete in accordance with paragraph (b)(1) through (3) of this clause.

(End of clause)

**G.5 NFS 1852.245-76 LIST OF GOVERNMENT PROPERTY FURNISHED
PURSUANT TO FAR 52.245-1. (JAN 2011)**

For performance of work under this contract, the Government will make available Government property identified below or in Attachment J-33, *Government Furnished Property, Facilities, and Data/Information* of this contract on a no charge-for-use basis pursuant to the clause at FAR 52.245-1, Government Property, as incorporated in this contract. The Contractor shall use this property in the performance of this contract at JSC, KSC, Cape Canaveral Space Force Station, Contractor locations identified in Clause F.4 Place of Performance, and at other location(s) as may be approved by the Contracting Officer. Under FAR 52.245-1, the Contractor is accountable for the identified property.

(End of clause)

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G.6 NFS 1852.245-82 OCCUPANCY MANAGEMENT REQUIREMENTS. (SEP 2017)

(a) In addition to the requirements of the clause at FAR 52.245-1, Government Property, as included in this contract, the Contractor shall comply with the following in performance of work in and around Government real property:

- (1) NPD 8800.14, Policy for Real Estate Management.
- (2) NPD 8831.2, Facilities Maintenance and Operations Management.

(b) The Contractor shall obtain the written approval of the Contracting Officer before installing or removing Contractor-owned property onto or into any Government real property or when movement of Contractor-owned property may damage or destroy Government-owned property. The Contractor shall restore damaged property to its original condition at the Contractor's expense.

(c) The Contractor shall not acquire, construct, or install any fixed improvement or structural alterations in Government buildings or other real property without the advance, written approval of the Contracting Officer. Fixed improvement or structural alterations, as used herein, means any alteration or improvement in the nature of the building or other real property that, after completion, cannot be removed without substantial loss of value or damage to the premises. Title to such property shall vest in the Government.

(d) The Contractor shall report any real property or any portion thereof when it is no longer required for performance under the contract, as directed by the Contracting Officer.

(End of clause)

G.7 JSC 52.204-92 NASA SECURITY PROGRAM AND IDENTIFICATION OF EMPLOYEES (JUL 2022)

(a) The contractor shall adhere to Center and Agency-wide program policy and guidance for security operations and the Contractor shall comply with the following:

- NPR 1600.1, NASA Security Program Procedural Requirements (current version)
- NPD 1600.9, NASA Insider Threat Program
- NPD 1600.3, Policy on Prevention of and Response to Workplace Violence
- NPR 1600.3, *Personnel Security* (current version)
- NPR 1600.4, Identity and Credential Management. (Current Version)

(b) For any contract requiring a Facility Clearance Level (FCL) for access to Classified National Security Information (CNSI), the contractor shall adhere to the Agency-wide program policy and guidance related to the protection of CNSI by complying with the following:

- NPR 1600.2, NASA Classified National Security Information (current version)

(c) For any contract requiring an FCL for access to CNSI and requiring access to Communications Security (COMSEC) equipment, the contractor shall adhere to the Agency-wide program policy and guidance related to the protection of COMSEC equipment by complying with the following:

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- NPR 1600.6, *Communications Security (COMSEC)* (NPR 1600.6 is a protected document that can be obtained by contractors that have a need-to-know. The JSC point of contact is the JSC COMSEC Account Manager (CAM)).

(d) At all times while on NASA property, the contractor, subcontractors, their employees, and agents shall wear NASA issued credentials. NASA credentials will be issued in accordance with NPR 1600.4, Identity and Credential Management. The employee's Facility Security Officer (FSO) and/or Designated Official (DO) will submit an identity request for temporary (between 29 and 179 days) or permanent (greater than 180 days) credentials within the NASA Identity and Access Management (IdMAX) system.

(e) Credentials will be issued at the following locations:

- Johnson Space Center (JSC) Badging Office, Building 110, Monday through Friday excluding holidays.
- White Sands Test Facility (WSTF), Protective Services Office Building, Building 108, Monday through Friday excluding holidays. WSTF visitor credentials will be issued on a 7-day-a-week, 24-hour-a-day basis.

(f) The FSO/DO needing identity requester rights, must complete the following training in SATERN: Personal Identity Verification (PIV) – ICAM Overview “AG-PIV-ICAM-OVERVIEW” and Personal Identity Verification (PIV) – Requester Module “AG-PIV-IDENTITY-REQUESTER.” After completion of the training, the FSO/DO will request the following rights in NAMS: Agency ICAM Infrastructure; with the Identity Requester role. Lastly, submit a JSC Form (JF) 200, *NASA JSC Agreement Maintenance Card* to be added as a Requester for the contract/agreement of responsibility. This will allow the contractor to have identity requester privileges within IdMAX.

(g) For temporary credential requests, the FSO/DO will submit the credential request within IdMAX and instruct the employee to visit the JSC Badging Office to complete the enrollment process for the temporary credential. The employee will need to present two forms of matching I-9 identification documents to process a temporary credential. The list of acceptable I-9 documents can be found on the U.S. Citizenship and Immigration Services website located at.

(h) For permanent credential requests, the FSO/DO will submit the request within IdMAX. NASA Personnel Security will notify the employee via email to begin background investigation processing and will provide the employee the necessary forms to complete the eQIP process electronically. Once the background investigation process is complete, the employee will be notified to go to the JSC Badging Office or the NASA Facility nearest to the employee for enrollment. Employees will present two forms of matching I-9 identification documents to process for a permanent credential; and will receive a temporary 30-day credential or Interim Agency Smart Badge until the PIV credential is ready for pickup. When the PIV credential arrives, the employee will receive an email notification for credential pickup.

(i) The contractor shall be held accountable for issued credentials, keys, and other items. The contractor must assure credentials (returned to JSC Badging Office) and keys (returned to JSC

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Locksmith Office) are returned upon completion of work under the contract in accordance with the procedures listed on JF 760, JSC Termination/Retiree and Return for Future Use Checklist.

(End of clause)

G.8 SHIPPING INSTRUCTIONS

All documentation and other items shall be shipped to the address below as follows:

Freight Shipments

Ship to: NASA Johnson Space Center, Building 420
2101 NASA Parkway, Houston, TX 77058-3696

Mark for: Accountable Property Officer

Or

Transportation Officer, NASA
C/O BOSS Warehouse, Building M6-744
Kennedy Space Center, FL 32899

Mark with: Contract Number **TBD**

For reissue to:

Name: TBD

Mail Code: TBD

Bldg. & Room Number: TBD

(End of clause)

[END OF SECTION]

PART II – CONTRACT CLAUSES**SECTION H - SPECIAL CONTRACT REQUIREMENTS****H.1 LISTING OF CLAUSES INCORPORATED BY REFERENCE**

Clause(s) at the beginning of this Section are incorporated by reference, with the same force and effect as if they were given in full text. Clauses incorporated by reference which require a fill-in by the Government include the text of the affected paragraph(s) only. This does not limit the clause to the affected paragraph(s). The Contractor is responsible for understanding and complying with the entire clause.

The following contract clauses pertinent to this section are hereby incorporated by reference:

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)

CLAUSE NUMBER	DATE	TITLE
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II. NASA FAR SUPPLEMENT (48 CFR CHAPTER 18)

CLAUSE NUMBER	DATE	TITLE
1852.223-70	DEC 2015	SAFETY AND HEALTH MEASURES AND MISHAP REPORTING
1852.223-75	FEB 2002	MAJOR BREACH OF SAFETY OR SECURITY.
1852.235-73	DEC 2006	FINAL SCIENTIFIC AND TECHNICAL REPORTS. ALTERNATE II (DEC 2005)
1852.242-72	OCT 2015	DENIED ACCESS TO NASA FACILITIES
1852.244-70	APR 1985	GEOGRAPHIC PARTICIPATION IN THE AEROSPACE PROGRAM
1852.247-71	JUN 2018	PROTECTION OF THE FLORIDA MANATEE

(End of Clauses Incorporated by Reference)

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H.2 NFS 1852.209-71 LIMITATION OF FUTURE CONTRACTING. (DEC 1988)

- (a) The Contracting Officer has determined that this acquisition may give rise to potential OCI. Accordingly, the attention of prospective offerors is invited to FAR Subpart 9.5--OCI.
- (b) The nature of these conflicts are that in performing this contract, there are situations where the services performed may give rise to the significant potential OCI listed below.
 - (1) There is a concern that the successful contractor or its proposed subcontractor(s), as part of their performance of a Government contract, obtains access to another contractor's proprietary, business confidential, or financial data and/or non-public Government information, which may provide the firm an unfair competitive advantage in a future competition. The contractor shall protect this data/information from unauthorized use and disclosure and agrees not to use it, either directly or indirectly, in any proposals responding to a future Government solicitation.
- (c) The restrictions upon future contracting are as follows:
 - (1) To the extent that the work under this contract requires access to proprietary, business confidential, or financial data of other companies, and as long as this data remain proprietary or confidential, the contractor and its subcontractors shall protect this data from authorized use and disclosure and agree not to use this data, either directly or indirectly, in any proposals responding to a future Government solicitation. Similarly, the contractor and its subcontractors shall protect Government non-public information from unauthorized use and disclosure and agree not to use it, either directly or indirectly, in any proposals responding to a future Government solicitation. If the contractor and/or its subcontractor are unable to demonstrate adequate protection to ensure that non-public data/information could not be used to improve their competitive position in a future procurement, they will be ineligible for award of the contract resulting from such procurement.

(End of clause)

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H.3 NFS 1852.225-70 EXPORT LICENSES. (FEB 2000) (ALT I) (FEB 2000)

(a) The Contractor shall comply with all U.S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR, 22 CFR parts 120-130, and the Export Administration Regulations (EAR, 15 CFR parts 730-799, in the performance of this contract. In the absence of available license exemptions/exceptions, the Contractor shall be responsible for obtaining the appropriate licenses or other approvals, if required, for exports of hardware, technical data, and software, or for the provision of technical assistance.

(b) The Contractor shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of this contract, including instances where the work is to be performed on-site at Johnson Space Center, where the foreign person will have access to export-controlled technical data or software.

(c) The Contractor shall be responsible for all regulatory record keeping requirements associated with the use of licenses and license exemptions/exceptions.

(d) The Contractor shall be responsible for ensuring that the provisions of this clause apply to its subcontractors.

(e) The Contractor may request, in writing, that the Contracting Officer authorizes it to export ITAR-controlled technical data (including software) pursuant to the exemption at 22 CFR 125.4(b)(3). The Contracting Officer or designated representative may authorize or direct the use of the exemption where the data does not disclose details of the design, development, production, or manufacture of any defense article.

(End of clause)

H.4 NFS 1852.228-76 CROSS-WAIVER OF LIABILITY FOR INTERNATIONAL SPACE STATION ACTIVITIES (OCT 2012)

(a) The Intergovernmental Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America concerning Cooperation on the Civil International Space Station (IGA) for the International Space Station (ISS) contains a cross-waiver of liability provision to encourage participation in the exploration, exploitation, and use of outer space through the ISS. The objective of this clause is to extend this cross-waiver of liability to NASA contracts in the interest of encouraging participation in the exploration, exploitation, and use of outer space through the International Space Station (ISS). The Parties intend that this cross-waiver of liability be broadly construed to achieve this objective.

(b) As used in this clause, the term:

(1) “*Agreement*” refers to any NASA Space Act agreement that contains the cross-waiver of liability provision authorized by 14 CFR 1266.102.

(2) “*Damage*” means:

(i) Bodily injury to, or other impairment of health of, or death of, any person;

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- (ii) Damage to, loss of, or loss of use of any property;
- (iii) Loss of revenue or profits; or
- (iv) Other direct, indirect, or consequential Damage.

(3) “*Launch Vehicle*” means an object, or any part thereof, intended for launch, launched from Earth, or returning to Earth which carries Payloads or persons, or both.

(4) “*Partner State*” includes each Contracting Party for which the IGA has entered into force, pursuant to Article 25 of the IGA or pursuant to any successor agreement. A Partner State includes its Cooperating Agency. It also includes any entity specified in the Memorandum of Understanding (MOU) between NASA and the Government of Japan to assist the Government of Japan's Cooperating Agency in the implementation of that MOU.

(5) “*Party*” means a party to a NASA Space Act agreement involving activities in connection with the ISS and a party that is neither the prime contractor under this contract nor a subcontractor at any tier.

(6) “*Payload*” means all property to be flown or used on or in a Launch Vehicle or the ISS.

(7) “*Protected Space Operations*” means all Launch or Transfer Vehicle activities, ISS activities, and Payload activities on Earth, in outer space, or in transit between Earth and outer space in implementation of the IGA, MOUs concluded pursuant to the IGA, implementing arrangements, and contracts to perform work in support of NASA's obligations under these Agreements. It includes, but is not limited to:

- (i) Research, design, development, test, manufacture, assembly, integration, operation, or use of Launch or Transfer Vehicles, the ISS, Payloads, or instruments, as well as related support equipment and facilities and services; and
- (ii) All activities related to ground support, test, training, simulation, or guidance and control equipment and related facilities or services. “Protected Space Operations” also includes all activities related to evolution of the ISS, as provided for in Article 14 of the IGA. “Protected Space Operations” excludes activities on Earth, which are conducted on return from the ISS to develop further a Payload's product or process for use other than for ISS-related activities in implementation of the IGA.

(8) “*Related Entity*” means:

- (i) A contractor or subcontractor of a Party or a Partner State at any tier;
- (ii) A user or customer of a Party or a Partner State at any tier; or
- (iii) A contractor or subcontractor of a user or customer of a Party or a Partner State at any tier. The terms “contractor” and “subcontractor” include suppliers of any kind.

(9) “*Transfer Vehicle*” means any vehicle that operates in space and transfers Payloads or persons or both between two different space objects, between two different locations on the same space object, or between a space object and the surface of a celestial body. A Transfer Vehicle also includes a vehicle that departs from and returns to the same location on a space object.

(c) Cross-waiver of liability:

(1) The Contractor agrees to a cross-waiver of liability pursuant to which it waives all claims against any of the entities or persons listed in paragraphs (c)(1)(i) through (c)(1)(iv) of this clause based on Damage arising out of Protected Space Operations. This cross-

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waiver shall apply only if the person, entity, or property causing the Damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations. The cross-waiver shall apply to any claims for Damage, whatever the legal basis for such claims, against:

- (i) A Party as defined in (b)(5) of this clause;
- (ii) A Partner State other than the United States of America;
- (iii) A Related Entity of any entity identified in paragraph (c)(1)(i) or (c)(1)(ii) of this clause; or
- (iv) The employees of any of the entities identified in paragraphs (c)(1)(i) through (c)(1)(iii) of this clause.

(2) In addition, the contractor shall, by contract or otherwise, extend the cross-waiver of liability set forth in paragraph (c)(1) of this clause to its subcontractors at any tier by requiring them, by contract or otherwise, to:

- (i) Waive all claims against the entities or persons identified in paragraphs (c)(1)(i) through (c)(1)(iv) of this clause; and
- (ii) Require that their subcontractors waive all claims against the entities or persons identified in paragraphs (c)(1)(i) through (c)(1)(iv) of this clause.

(3) For avoidance of doubt, this cross-waiver of liability includes a cross-waiver of claims arising from the *Convention on International Liability for Damage Caused by Space Objects*, which entered into force on September 1, 1972, where the person, entity, or property causing the Damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations.

(4) Notwithstanding the other provisions of this clause, this cross-waiver of liability shall not be applicable to:

- (i) Claims between the Government and its own contractors or between its own contractors and subcontractors;
- (ii) Claims made by a natural person, his/her estate, survivors or subrogees (except when a subrogee is a Party to an Agreement or is otherwise bound by the terms of this cross-waiver) for bodily injury to, or other impairment of health of, or death of, such person;
- (iii) Claims for Damage caused by willful misconduct;
- (iv) Intellectual property claims;
- (v) Claims for Damage resulting from a failure of the contractor to extend the cross-waiver of liability to its subcontractors and related entities, pursuant to paragraph (c)(2) of this clause;
- (vi) Claims by the Government arising out of or relating to the contractor's failure to perform its obligations under this contract.

(5) Nothing in this clause shall be construed to create the basis for a claim or suit where none would otherwise exist.

(6) This cross-waiver shall not be applicable when 49 U.S.C. Subtitle IX, Chapter 701 is applicable.

(End of clause)

PART II – CONTRACT CLAUSES**H.5 NFS 1852.232-77 LIMITATION OF FUNDS (FIXED-PRICE CONTRACT). (MAR 1989)**

(a) Of the total price of items CLIN 1 through CLIN 5, the sum of \$(b) (4) is presently available for payment and allotted to this contract. It is anticipated that from time-to-time additional funds will be allocated to the contract in accordance with the following schedule, until the total price of said items is allotted:

SCHEDULE FOR ALLOTMENT OF FUNDS

Date	Amounts
TBD	TBD

(b) The Contractor agrees to perform or have performed work on the items specified in paragraph (a) of this clause up to the point at which, if this contract is terminated pursuant to the Termination for Convenience of the Government clause of this contract, the total amount payable by the Government (including amounts payable for subcontracts and settlement costs) pursuant to paragraphs (f) and (g) of that clause would, in the exercise of reasonable judgment by the Contractor, approximate the total amount at the time allotted to the contract. The Contractor is not obligated to continue performance of the work beyond that point. The Government is not obligated in any event to pay or reimburse the Contractor more than the amount from time to time allotted to the contract, anything to the contrary in the Termination for Convenience of the Government clause notwithstanding.

(c) (1) It is contemplated that funds presently allotted to this contract will cover the work to be performed until **January 6, 2025**.

(2) If funds allotted are considered by the Contractor to be inadequate to cover the work to be performed until that date, or an agreed date substituted for it, the Contractor shall notify the Contracting Officer in writing when within the next 60 days the work will reach a point at which, if the contract is terminated pursuant to the Termination for Convenience of the Government clause of this contract, the total amount payable by the Government (including amounts payable for subcontracts and settlement costs) pursuant to paragraphs (f) and (g) of that clause will approximate 75 percent of the total amount then allotted to the contract.

(3) (i) The notice shall state the estimated date when the point referred to in paragraph (c)(2) of this clause will be reached and the estimated amount of additional funds required to continue performance to the date specified in paragraph (c)(1) of this clause, or an agreed date substituted for it.

(ii) The Contractor shall, 60 days in advance of the date specified in paragraph (c)(1) of this clause, or an agreed date substituted for it, advise the Contracting Officer in writing as to the estimated amount of additional funds required for the timely performance of the contract for a further period as may be specified in the contract or otherwise agreed to by the parties.

(4) If, after the notification referred to in paragraph (c)(3)(ii) of this clause, additional funds are not allotted by the date specified in paragraph (c)(1) of this clause, or an agreed date substituted for it, the Contracting Officer shall, upon the Contractor's written request, terminate this contract on that date or on the date set forth in the request, whichever is later, pursuant to the Termination for Convenience of the Government clause.

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(d) When additional funds are allotted from time to time for continued performance of the work under this contract, the parties shall agree on the applicable period of contract performance to be covered by these funds. The provisions of paragraphs (b) and (c) of this clause shall apply to these additional allotted funds and the substituted date pertaining to them, and the contract shall be modified accordingly.

(e) If, solely by reason of the Government's failure to allot additional funds in amounts sufficient for the timely performance of this contract, the Contractor incurs additional costs or is delayed in the performance of the work under this contract, and if additional funds are allotted, an equitable adjustment shall be made in the price or prices (including appropriate target, billing, and ceiling prices where applicable) of the items to be delivered, or in the time of delivery, or both.

(f) The Government may at any time before termination, and, with the consent of the Contractor, after notice of termination, allot additional funds for this contract.

(g) The provisions of this clause with respect to termination shall in no way be deemed to limit the rights of the Government under the default clause of this contract. The provisions of this Limitation of Funds clause are limited to the work on and allotment of funds for the items set forth in paragraph (a). This clause shall become inoperative upon the allotment of funds for the total price of said work except for rights and obligations then existing under this clause.

(h) Nothing in this clause shall affect the right of the Government to terminate this contract pursuant to the Termination for Convenience of the Government clause of this contract.

(End of clause)

H.6 NFS 1852.235-71 KEY PERSONNEL AND FACILITIES (MAR 1989)

(a) The personnel and/or facilities listed below (or specified in the contract Schedule) are considered essential to the work being performed under this contract. Before removing, replacing, or diverting any of the listed or specified personnel or facilities, the Contractor shall

- (1) Notify the Contracting Officer reasonably in advance; and
- (2) Submit justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on this contract.


(b) The Contractor shall make no diversion without the Contracting Officer's written consent; provided, that the Contracting Officer may ratify in writing the proposed change, and that ratification shall constitute the Contracting Officer's consent required by this clause.

Key Personnel (fill in name):

- (b) (4) [REDACTED], Program Manager
- (b) (4) [REDACTED], Chief Engineer
- (b) (4) [REDACTED], Chief Safety Officer
- (b) (4) [REDACTED], System Engineering and Integration Manager

Key Facilities (fill in name):

[REDACTED]

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(End of clause)

H.7 NFS 1852.235-74 ADDITIONAL REPORTS OF WORK - RESEARCH AND DEVELOPMENT. (FEB 2003)

In addition to the final report required under this contract, the Contractor shall submit the following report(s) to the Contracting Officer:

(a) *Monthly progress reports.* The Contractor shall submit separate monthly reports of all work accomplished during each month of contract performance. Reports shall be in narrative form, brief, and informal. They shall include a quantitative description of progress, an indication of any current problems that may impede performance, proposed corrective action, and a discussion of the work to be performed during the next monthly reporting period.

(b) *Quarterly progress reports.* The Contractor shall submit separate quarterly reports of all work accomplished during each three-month period of contract performance. In addition to factual data, these reports should include a separate analysis section interpreting the results obtained, recommending further action, and relating occurrences to the ultimate objectives of the contract. Sufficient diagrams, sketches, curves, photographs, and drawings should be included to convey the intended meaning.

(c) *Submission dates.* Monthly and quarterly reports shall be submitted by the 15th day of the month following the month or quarter being reported. If the contract is awarded beyond the middle of a month, the first monthly report shall cover the period from award until the end of the following month. No monthly report need be submitted for the third month of contract effort for which a quarterly report is required. No quarterly report need be submitted for the final three months of contract effort since that period will be covered in the final report. The final report shall be submitted within 60 days after the completion of the effort under the contract.

(End of clause)

H.8 UNIDENTIFIED DATA CONTAINING RESTRICTIVE OR LIMITING MARKINGS

(a) Unidentified data are data containing a restrictive or limiting marking whether or not authorized by this contract and not previously identified in Attachment J-36, *Authorized Limited Rights in Data and Restricted Computer Software*.

(b) If the Contracting Officer notifies the Contractor of unidentified data delivered under this contract and the Contractor fails to (i) provide written justification to substantiate the unidentified data are properly identified in an existing Attachment J-36, *Authorized Limited Rights in Data and Restricted Computer Software* or (ii) provide a new Identification and Representation of Limited Rights Data and Restricted Computer Software in accordance with Attachment J-36, *Authorized Limited Rights in Data and Restricted Computer Software* of this contract within 60 calendar days after receipt of such notice, the Government shall have

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the right to cancel or ignore the markings after said period and the data will no longer be made subject to any disclosure prohibitions.

(c) Costs and expenses associated with correction of unidentified data containing a restrictive or limiting marking are unallowable costs under this contract. The Contractor shall be responsible for substantiating the markings at its own expense regardless if the markings originate from the Contractor or from a subcontractor.

(End of clause)

H.9 NASA INSIGHT AND APPROVAL

The NASA Insight and Approval describes the intended primary working-level interface between the Contractor and the Government during execution of this contract. It is intended to facilitate an exchange of information adequate for nominal activities.

NASA insight is defined as gaining an understanding of the Contractor's activities and data through an effective working relationship, inspections, and interactions, without approval or disapproval authority, and provides information to support the USDV acceptance. Knowledge gained through insight allows NASA to assess the overall risk of the Contractor actions during design, production, assembly, integration, testing, qualification, and acceptance of the USDV. NASA insight includes insight into the Contractor, subcontractor, vendors, and partner entities performing USDV design, development, manufacturing, management, mission integration, vehicle integration, operations, training and certification, and hardware/software testing to meet USDV requirements, interfaces, integration, and operations.

NASA retains insight into the components of the USDV design, development, analysis, manufacture and processes, integration, test, evaluation, verification, acceptance, training, sustaining, and operations in order to assess the risk through the USDV life cycle. NASA also performs insight through Government Quality Assurance (GQA) functions such as observation of manufacturing, processing, and tests; product examination; process witnessing; record review; audits, surveillance, and assessments of contractor plans, procedures, and processes; review of documentation; and attendance at meetings, including NASA participation on Contractor-led boards.

NASA approval is defined as providing authority to proceed and/or formal acceptance of requirements, deliverables, plans, tests, or success criteria in specified areas. Areas requiring NASA approval are related to compliance with SSP 51101, *U.S. Deorbit Vehicle Systems Requirements Document*, SSP 51105, *U.S. Deorbit Vehicle Integration Plan*, Attachment J-01, *Data Requirements Description (DRD)*, and SOW Section 2.6, *NASA Insight and Approval*.

Fulfillment of this clause could require the Contractor to execute third-party data rights agreements with its suppliers, as well as rights to information developed under other programs, to provide adequate NASA insight on supplies and services procured by the Contractor.

The Contractor shall obtain signed commitments to comply with the terms of the Insight and Approval clause and Statement of Work requirements from any major team member, subcontractor, sub-tier contractor, or supplier with an estimated value in excess of \$50M or that

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will manufacture critical vehicle components (e.g., propulsion, avionics, software, rendezvous and docking, guidance and navigation systems, etc.).

The Contractor shall provide the Government and NASA designated personnel, ongoing access to all data used in the performance of this contract including, but not limited to: data associated with areas of insight, oversight, and approval as identified in the SOW Section 2.6 *NASA Insight and Approval* and this clause.

The Contractor shall provide the Government and NASA designated personnel access to all Contractor activities associated with USDV and safety approval under this contract. Where NASA insight is required, the Contractor shall notify the COR of reviews or tests in sufficient time to permit NASA attendance and participation through the entire event. Should approval or insight identify non-compliance with the terms and conditions of the contract, a difference in interpretation of test results, or disagreement with the Contractor technical directions, NASA will take appropriate action within the terms of the contract to ensure compliance via written direction to the Contractor.

Notwithstanding the insight and approvals set forth in the NASA INSIGHT AND APPROVAL clause, herein, the Contractor assumes full performance responsibility as set forth in this contract, and neither NASA's insight nor its approval under this clause shall be construed as a defense to any finding of success or failure or final acceptance or rejection of the design and production of the USDV.

(End of clause)

H.10 ASSOCIATE CONTRACTOR AGREEMENTS

(a) The success of the International Space Station (ISS) Program is dependent on the efforts of multiple contractors. The USDV contractor is a key participant. In order to achieve efficient and effective implementation of the USDV, the Contractor shall establish the means for coordination and exchange of information, including avionics data and software, with associate contractors. The information to be exchanged shall be that required by the contractors in the execution of their respective contract requirements. The Contractors are strongly encouraged to seek out and foster cooperative efforts that will benefit the ISS Program with increased safety, efficiency, and productivity. At a minimum, the Contractor will enter into Associate Contractor Agreements (ACAs) with the contractors of the contracts listed below and their successors. Additional contractors will be added to this list to reflect other ISS and NASA contracts or agreements when a specific interface for the USDV contract is identified.

NASA Contract / Agreement Number	Title of NASA Contract or Agreement	Contractor / Entity
80KSC023DA016	Consolidated Operations, Management, Engineering, and Test (COMET)	Jacobs Technology Inc.

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NASA Contract / Agreement Number	Title of NASA Contract or Agreement	Contractor / Entity
80JSC022DA035	JSC Engineering, Technology, and Science (JETS) II	Jacobs Technology Inc
NNJ14RA01B	Integrated Mission Operations Contract 2 (IMOC2)	SGT, Inc
80JSC017C0006	Mission Systems Operations Contract (MSOC)	KBR
80JSC020C0017	Human Space Flight Technical Integration Contract (HSFTIC)	Barrios
NAS 15-10000	International Space Station (ISS) Vehicle Sustaining Engineering Contract	Boeing
80JSC019D0008	Safety and Mission Assurance Engineering Contract (SMAEC) II	Science Applications International Corporation (SAIC)
80JSC020D0017	Commercial Destination Development in Low Earth Orbit (LEO) Free Flyer (CDISS)	Axiom Space
TBD	LSP Launch Service Provider (not determined yet)	TBD
TBD	LSP Payload Processing Facility Provider (not determined yet)	TBD

(b) The Contractor shall document agreements with other associate contractors of the contracts described in (a) above and their successors, via associate contractor agreements. The Government will not be a party in such associate contractor agreements. A copy of each such agreement shall be provided to the Contracting Officer. All costs associated with such agreements are included in the negotiated cost of this contract.

(c) The Contractor is not relieved of any contract requirements or entitled to any adjustments to the contract terms because of the failure to resolve a disagreement with an associate contractor. Liability for the improper disclosure of any proprietary data contained in or referenced by any agreement shall rest with the parties to the agreement, and not the Government.

(d) This joint cooperation will be evaluated as part of the Government's input to the contract annual Contractor Performance Assessment Reporting System (CPARS) process. Successful performance will be determined by the Government's assessment of the overall and combined performance of the requirements in the contracts, as modified

(End of clause)

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H.11 DATA CONTAINING AN INCORRECT NOTICE

- (a) The unauthorized marking of data provision in FAR 52.227-14(e) is not the exclusive procedure for cancelling or ignoring an incorrect notice.
- (b) Costs and expenses associated with correction of an incorrect notice are unallowable costs under this contract. The Contractor shall be responsible for substantiating an incorrect notice at its own expense regardless if the marking originates from the Contractor or from a subcontractor.
- (c) If the Contracting Officer notifies the Contractor of an incorrect notice and the Contractor fails to remove or correct the marking within 60 days after receipt of such notice, the Government, at the Contracting Officer's sole discretion, shall have the right to cancel or ignore the markings after said period and the data will no longer be made subject to any disclosure prohibitions.

(End of clause)

H.12 INCORRECT NOTICE AND REQUIREMENTS FOR WRITTEN JUSTIFICATION OF RESTRICTED MARKINGS

- (a) For purposes of this contract, Incorrect notice means a marking placed on data or computer software delivered or otherwise furnished to the Government under this contract that is not in a format authorized by this contract.
- (b) Pursuant to FAR 52.227-14(e)(1),
- (i) the Contractor's written justification to substantiate the markings shall include historical documentary evidence that clearly identifies the stages of technical development and the source of funds at a lowest segregable level pertaining to an item, component, process, or computer software. Conclusory statements without supporting historical documentary evidence shall constitute a failure to provide written justification to substantiate the propriety of the markings; and
 - (ii) costs and expenses associated with substantiating the markings are unallowable costs under this contract. The Contractor shall be responsible for substantiating the markings at its own expense regardless if the markings originate from the Contractor or from a subcontractor.

(End of clause)

H.13 PAYMENTS, EVENTS, AND ACCOMPLISHMENT CRITERIA

- (a) Upon successful completion of a milestone the Contractor may request interim-milestone payments in accordance with Clause I.14, Performance-Based Payments, and submission of a properly certified invoice. Interim payments will be made in accordance with the Attachment J-30, *Work Plans* and established in each task order. The sum of interim-milestone financing payments with each delivery item shall not exceed 80% of that delivery item price in accordance with FAR 32.1004(b)(2)(ii). Liquidation of performance-based financing payments will occur once the Government accepts completion of services.

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(b) The Contracting Officer will unilaterally determine the Contractor's accomplishment and successful completion of each milestone in accordance with each Program Event . The Contracting Officer's determination of milestone completion will include, but is not limited to, the Accomplishment Criteria listed in the Attachment J-30, *Work Plans*, or the task order.

(c) If modifications are issued against this contract, the payments schedule will be adjusted as necessary to reflect the actions required by those contract modifications.

(End of clause)

H.14 SAE AS9100

The Contractor shall have and maintain a quality program that complies with International Organization for Standardization document SAE AS9100, *Quality Management Systems – Requirements for Aviation, Space and Defense Organizations* at contract award.

Third party certification is not required. However, if the Government has accepted the Contractor's SAE AS9100 certification and the Contractor subsequently changes registrars, loses its registration status, or is put on notice of losing its registration status, the Contractor shall notify the Contracting Officer within three days of receiving such notice from its registrar.

If the Contractor is not SAE AS9100 certified, the Government may perform, or have a third party perform, an SAE AS9100 compliance audit no earlier than six (6) months after contract award.

Compliance audits will normally be re-accomplished every thirty-six (36) months, but the Government may conduct annual surveillance audits. The Contractor shall support the audits as required.

The Contractor shall coordinate with any Certification Registrars or Databases or Certifying Organizations to allow NASA access to certification documentation and audit information pertinent to this contract.

(End of clause)

H.15 MITIGATION OF ORGANIZATIONAL CONFLICTS OF INTEREST

(a) Mitigation plan. The Organizational Conflict of Interest Avoidance/Mitigation Plan and its obligations are hereby incorporated into the contract Attachment J-10, *Organizational Conflicts of Interest (OCI) Plan*.

(b) Changes.

(1) Either the Contractor or the Government may propose changes to the Organizational Conflict of Interest Mitigation Plan. Such changes are subject to the mutual agreement of the parties and will become effective only upon incorporating the change into the plan by contract amendment.

(2) In the event that the Government and the Contractor cannot agree upon a mutually acceptable

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change, the Government reserves the right to make a unilateral change to the OCI Plan as necessary, with the approval of the head of the contracting activity, subject to Contractor appeal as provided in the Disputes clause.

(c) Violation. The Contractor shall report any violation of the Organizational Conflict of Interest Mitigation Plan, whether by its own personnel or those of the Government or other contractors, to the Contracting Officer. This report shall include a description of the violation and the actions the Contractor has taken or proposes to take to mitigate and avoid repetition of the violation. After conducting such further inquiries and discussions as may be necessary, the Contracting Officer and the Contractor shall agree on appropriate corrective action, if any, or the Contracting Officer shall direct corrective action.

(d) Breach. Any breach of the above restrictions or any nondisclosure or misrepresentation of any relevant facts required regarding organizational conflicts of interests to be disclosed may result in termination of this contract for default or other remedies as may be available under law or regulation.

(e) Subcontracts. The Contractor shall include the substance of this clause, including this paragraph (e), in subcontracts where the work includes or may include tasks related to the organizational conflict of interest. The terms —Contractor and —Contracting Officer shall be appropriately modified to reflect the change in parties and to preserve the Government’s rights.
(End of clause)

H.16 DISCLOSURE OF ORGANIZATIONAL CONFLICTS OF INTEREST AFTER CONTRACT AWARD

(a) If the Contractor identifies an actual or potential organizational conflict of interest that has not already been adequately disclosed and resolved (or waived in accordance with FAR 9.503), the Contractor shall make a prompt and full disclosure in writing to the Contracting Officer. This disclosure shall include a description of the action the Contractor has taken or proposes to take in order to resolve the conflict. This reporting requirement also includes subcontractors ‘actual or potential organizational conflicts of interest not adequately disclosed and resolved prior to award.

(b) Mitigation plan. The Contractor shall periodically update the plan, based on changes such as changes to the legal entity, the overall structure of the organization, subcontractor arrangements, contractor management, ownership, ownership relationships, or modification of the work scope.
(End of clause)

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H.17 IDENTIFICATION AND REPRESENTATION OF LIMITED RIGHTS DATA AND RESTRICTED COMPUTER SOFTWARE AFTER AWARD

(a) This clause does not apply to restrictions based solely on copyright.

(b) Except as provided in paragraph (c) of this clause, limited rights data and restricted computer software to be delivered in performance of this contract are identified in pursuant to the Attachment J-36, *Authorized Limited Rights in Data and Restricted Computer Software*. The Contractor shall not deliver any data in performance of this contract with restrictive or limiting markings unless the data are listed pursuant to the Attachment J-36, *Authorized Limited Rights in Data and Restricted Computer Software* or as defined in paragraph (c) of this clause.

(c) In addition to the representations made pursuant to the Attachment J-36, *Authorized Limited Rights in Data and Restricted Computer Software*, other representations may be made after award when based on new information or inadvertent omission unless the inadvertent omission would have materially affected the Government's source selection decision, a payment decision, or both. Such identification and representations may be made after award whereby the Contractor shall submit a request to the Contracting Officer as soon as practicable after initial identification in an approved format and signed by an official authorized to contractually obligate the Contractor. The Contracting Officer will consider such a request and determine whether or not to accept the request and incorporate the request in a contract modification.

(End of clause)

H.18 TECHNICAL DATA AND COMPUTER SOFTWARE – WITHHOLDING OF PAYMENT

(a) If technical data or computer software, specified to be delivered under this contract, are not delivered within the time specified by this contract or are deficient upon delivery, the Contracting Officer may until such data are accepted by the Government, withhold payment to the Contractor (for each claim for payment) of either ten percent (10%) of the total contract price or a lesser withholding amount specified in paragraph (c) of this clause. Payments shall not be withheld, nor any other action taken pursuant to this paragraph when the Contractor's failure to make timely delivery or to deliver such data without deficiencies arises out of causes due to the fault of the Government.

(b) The withholding of any amount or subsequent payment to the Contractor shall not be construed as a waiver of any rights accruing to the Government under this contract.

(c) The Contracting Officer may withhold 10% of the total contract price in accordance with paragraph (a) of this clause.

(d) The Contractor's failure to make timely delivery of technical data or computer software specified to be delivered under this contract or to deliver such data without deficiencies may not be based on past or commensurate actions by the Government regarding payment to the Contractor (or to a different Contractor) in light of the same or similar failures.

(End of clause)

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H.19 GOVERNMENT’S RIGHT TO REMOTELY SENSED DATA

(a) The Contractor consents for the U.S. Government to collect remotely sensed data on the USDV and to use such data for the U.S. Government’s purposes. The remotely sensed data may be used, modified, reproduced, released, performed, displayed, or disclosed within the Government, including USG support contractors, under suitable protective conditions.

(End of clause)

H.20 RESERVED

H.21 SPECIAL TOOLING, SPECIAL TEST EQUIPMENT, AND MANUFACTURING AIDS FOR USDV

Contractor shall notify NASA 60 calendar days prior to final disposition of special tooling, special test equipment, and manufacturing aids unique to the USDV.

(End of clause)

H.22 CONTRACTOR OBJECTIVES ON USDV

NASA owns all excess vehicle performance. The Contractor shall not include commercial payloads or items on or within the USDV structure for commercial use purposes.

(End of clause)

H.23 FOREIGN TRAVEL BY CONTRACTOR EMPLOYEES ON NASA OFFICIAL BUSINESS (JUL 2022)

Contractor employees (including subcontractors) traveling internationally in support of NASA official business must obtain a country clearance via the Department of State (DOS) electronic Country Clearance (eCC) process. DOS has the authority to grant, withhold, or limit permission for any personnel to travel internationally on U.S. Government official business.

Contractor employees traveling internationally on official NASA business are required to coordinate in advance with the Contracting Officer’s Representative (COR) and Center’s Foreign Travel Coordinator (FTC) prior to traveling, as DOS international travel guidance/policies, and conditions in foreign countries, are subject to change.

In order to obtain a country clearance via the eCC process, travelers must complete an Advance Travel Notification Form (ATNF) and submit it to their Center’s FTC. The form must be submitted at least 30 business days prior to departure in order to obtain a DOS eCC approval. Forms submitted less than 10 business days prior to departure have a presumption of denial, and require justification signed by the Center Director or designated senior individual at the cognizant NASA Center. Travelers must request the ATNF from the Center’s FTC. The list of Center FTCs can be accessed at

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(b) (5)

(This link is behind the NASA firewall – contact the COR to get the FTC name if not able to access).

Contractor employees on NASA foreign travel are required to use the International Traveler Checklist (ITC) that provides a list of travel-related items the traveler should review prior to international travel. The traveler does not need to submit the ITC form to the Center FTC; the form is for the benefit of the traveler only. The Center specific ITC can be obtained from the Center's FTC.

In addition to specifying the NASA traveler's contact information, the eCC request must indicate that the traveler has taken the appropriate training, as follows:

Counter Threat Awareness Training (CTAT): All contractor employees traveling internationally on NASA official business shall complete the CTAT training course (formerly known as High Threat Security Overseas Seminar (HTSOS)) regardless of destination. The CTAT course is available in NASA SATERN at no cost. If the contractor employee does not have access the SATERN, the training may also be acquired at <https://fsitraining.state.gov/home/7480> free of charge for employees of Other Government Agencies (OGAs) and all Third Party Contractors. To register, send a completed SF182 form (and contractor memorandum if applicable) to DSRegistrar@state.gov.

For any additional questions regarding the enrollment process, contact the DOS Registrar's Office at: [REDACTED]

The course certification is valid for six years; the validity is retroactive for individuals that completed the HTSOS course prior to the updated DOS guidance. NASA travelers should hand-carry a copy of their CTAT completion certificate with them on all official international travel.

Foreign Affairs Counter Threat (FACT): Contractor employees traveling internationally in support of official NASA business are not required to complete FACT training unless the requirement is specifically included elsewhere in this contract. However, depending on the country and other circumstances, the DOS Chief of Mission Authority may determine that this training is required for contractor employees on official U.S. Government business. The contractor shall coordinate with the COR and Center FTC to determine if the contractor employee(s) must complete the FACT training.

The FACT training is an in-person course. Travelers may go to the link below to review the most up-to-date DOS advisories prior to leaving:

<https://travel.state.gov/content/travel/en/traveladvisories/traveladvisories.html>. The course certification is valid for six years.

All NASA travelers are expected to comply with the current guidance and policies regarding health-related requirements in their destination country(ies), as well as the current requirements for reentry into the United States.

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In accordance with NPR 2810.2, titled *Possession and Use of NASA Information and Information Systems Outside of the United States and United States Territories*; NASA official international travelers shall take NASA IT devices or access NASA accounts only when authorized by the Center CIO or their designee, prior to travel. Travelers should follow their Center's international travel process in addition to this requirement statement. Specific questions regarding foreign travel and guidance/policy updates may be directed to the Center FTCs.

(End of clause)

H.24 COUNTERINTELLIGENCE BRIEFINGS (AUG 2022)

If a contractor or subcontractor employee is going on official NASA travel to designated countries, included on the list of current designated countries at <http://oiir.hq.nasa.gov/nasaecp/index.html>, Russia and/or other high intelligence-threat locations, a pre- and post-travel Counterintelligence Threat Briefing and Debriefing is required, per NASA Procedural Requirements (NPR) 1660.1 entitled, "*NASA Counterintelligence and Counterterrorism*." These briefings include information on the threat from foreign intelligence services, the need to protect NASA classified and sensitive information, elicitation techniques and methods, the impact to NASA when classified and/or sensitive information is lost or stolen and any current State Department advisories or warnings regarding the country(ies) to be visited. Contractor or subcontractor employees traveling to any designated countries, Russia and/or other high intelligence-threat locations, on official NASA business should receive the threat briefings from their company's security officials. When that is not possible or practicable, they shall contact the cognizant NASA Center Counterintelligence/Counter Terrorism (CI/CT) office at least two weeks prior to traveling to schedule a personalized foreign travel briefing. Contractor employees shall also schedule a debriefing within one week of returning from travel. The cognizant NASA CI/CT Office for NASA JSC, Robert Dietsch, can be reached at [REDACTED]. Briefings and debriefings may be done in person, via teleconference or by phone as necessary and no paperwork is required.

(End of clause)

H.25 USE OF GOVERNMENT RESOURCES

(a) General. While the majority of work to be completed under this contract shall be performed at Contractor or subcontractor facilities, and the responsibility for adequately staffing this contract and completing full contract performance resides solely with the Contractor, the Contractor may request the use of certain specified Government resources in accordance with this clause. This clause applies to the Contractor's use of those Government resources listed in Attachment J-31, Government Task Agreements, including property, facilities, assets, information and data, or services, whether obtained from NASA or another Government Agency; it does not apply to Government-furnished property (GFP) equipment (GFE), or data (GFD) otherwise provided under this contract under Attachment J-33, Government-Furnished Property and Data/Information.

(b) Use of NASA resources.

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(1) Types of resources.

(i) NASA on-site resources. The Contractor may propose to perform a portion of the work required under this contract using the property, facilities, assets, services, or other specialized resources uniquely available on-site (“on-site resources”) from a NASA Center, Component Facility, or the Jet Propulsion Laboratory (JPL) (any one of which is a “Performing Organization” hereafter in this clause). Such proposed requests must be within the scope of the contract and are subject to the availability of those resources and the Performing Organization’s ability and willingness to provide them. The Contractor shall limit requests for the use of on-site resources to only those Performing Organization facilities, services, or other resources that are unique or not otherwise reasonably available commercially. The Offeror shall document its planned use of or modifications to on-site resources through the execution and submission with proposal of one or more Government Task Agreements (GTAs). During contract performance, the Parties may agree to modify GTAs and/or execute additional GTAs if they mutually determine such agreements are necessary to respond to new or changed circumstances that arise during performance. GTA modifications are required when the requested scope is inconsistent with the original GTA Terms (e.g., more test runs are needed). The Contractor shall be responsible for the cost of any such new or modified GTA, and the Parties shall effectuate the addition of new or modified GTAs, and corresponding contract price adjustments, pursuant to FAR 52.243-1 – Changes – Fixed-Price (ALT V) and FAR 52.243-2 – Changes – Cost-Reimbursable (ALT V), as incorporated herein. The Offeror/Contractor shall follow the instructions for use of GTAs as provided in solicitation Attachment J-23 – Government Task Agreements. The Contractor shall contact the corresponding Center Partnership Office Point of Contact to negotiate the terms of each GTA. The Partnership Office Point of Contact shall provide a cost for each GTA, but the Contractor shall not include this cost in its Schedule B cost/ price. The total cost of all GTAs will be added to the Offeror’s Total Evaluated Price for proposal evaluation purposes only.

(2) Disclaimer. NASA makes no warranty whatsoever as to the availability or suitability of NASA property, facilities, assets, information and data, services, or FTEs made available under this clause.

The Contractor assumes all responsibility for determining the suitability for use of all NASA resources, including technical suitability, schedule availability, and cost. NASA provides all resources as-is. The Contractor uses all NASA resources at its own risk.

(3) Authority to commit the Government. The Contracting Officer retains sole authority to commit the Government in matters which would change contract price, quantity, delivery schedule, or any other requirement of this contract, including interpretation of technical requirements. The Contracting Officer may designate a representative (COR) to assist with contract administration within the limitations of authority as specified in its COR appointment letter. Individuals performing collaboration and/or insight have no authority to commit the Government, and nothing in this clause shall be construed to

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confer authority, actual or apparent, to these individuals. Such individuals may offer their opinions, advice, knowledge, or expertise to the Contractor during performance, but the Contractor is not bound to comply with this input and does so on its own accord and at its own risk.

(4) Impermissible use of NASA as a subcontractor or supplier. The Contractor shall not use the NASA resources made available pursuant to paragraphs (b)(1)(i) of this clause to solely provide any end-item deliverable, including spacecraft components, subsystems, or elements, nor any ground or flight hardware or software, that is the responsibility of the Contractor under the terms of this contract. The Contractor shall not rely solely on NASA for the provision of complete flight or ground operations in support of this effort. This paragraph does not prohibit the Contractor's use of GFE, GFP, or any other Government-furnished item provided by the Government pursuant to another term of this contract.

(5) Contractor Waiver of Claims. By choosing to use NASA in support of contract performance, Contractor hereby waives any claims against NASA, its employees, its related entities, (including, but not limited to, contractors and subcontractors at any tier, grantees, investigators, customers, users, and its contractors and subcontractors at any tier) and employees of NASA's related entities for any injury to, or death of, Contractor's employees or the employees of Contractor's related entities, or for damage to, or loss of, Contractor's property or the property of its related entities arising from or related to activities conducted pursuant to this Clause, whether such injury, death, damage, or loss arises through negligence or otherwise, except in the case of willful misconduct. The Contractor further agrees to extend this waiver to its related entities by requiring them, by contract or otherwise, to waive all claims against NASA, its related entities, and employees of NASA and employees of NASA's related entities for injury, death, damage, delay, or loss arising from or related to activities conducted pursuant to this clause.

(c) Use of resources from a Government Agency other than NASA. The Contractor shall obtain and maintain any necessary contracts or agreements between the Contractor and any Government Agency authorizing the use of Government property, facilities, assets, or services in performance of this contract (except as may be expressly stated in this contract as furnished by the Government). The Contractor shall be responsible to arrange any contracts or agreements outside of this contract as it deems appropriate. The terms and conditions of such contracts or agreements will govern the use of those Government resources. Any costs associated with such contracts or agreements shall result in no increase in the price of this contract. All remedies to disputes or performance issues shall be resolved in accordance with the terms and conditions of those contracts or agreements. The Contractor shall notify the Contracting Officer, COR, or designee of any contracts or agreements between the Contractor and any Government Agency under this paragraph. NASA makes no warranty whatsoever as to the availability or suitability for use of Government property, facilities, assets, or services made available by another Government Agency under the terms and conditions of other contracts or agreements. The Contractor assumes all responsibility for determining the suitability for use of all property, facilities, assets, or services acquired or made available to the Contractor by a Government Agency under other contracts or agreements. The Contractor further acknowledges and agrees

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that any use of such Government property, facilities, assets, or services shall not relieve the Contractor of full performance responsibility under the contract.

(d) Safeguarding of confidential or proprietary information. The Trade Secrets Act (18 U.S.C. § 1905) prohibits NASA personnel from disclosing the Contractor’s proprietary information unless authorized by law to do so. NASA will undertake all necessary precautions in order to ensure that Contractor confidential or proprietary information is protected throughout contract performance.

(e) Contractor responsibility. Notwithstanding the Contractor’s use of Government resources, the Contractor remains fully responsible for the performance of all requirements as set forth in this contract. The Government’s provision of the resources described in this clause shall not be construed as: authorization; endorsement or approval of milestones; certification or final acceptance or rejection of certification success; or as a defense to any finding of mission failure or final acceptance or rejection of contract deliverables.

(f) Use of Government Data or Information provided in accordance with this clause. The Contractor may use the data and information provided under this clause and related data, and any modified or enhanced versions thereof, only for performing work under this contract unless otherwise provided for in this contract, on the markings of the data and information provided under this clause, or approved in writing by the Contracting Officer.

(1) For data and information provided under this clause that display a copyright notice belonging to a third party, the Contractor shall not, without the express written permission of the Contracting Officer, reproduce, distribute copies, prepare derivative works, perform publicly, display publicly, release, or disclose the data and information provided under this clause or related data to any person except for the performance of work under this contract.

(2) Allocation of rights associated with any data and information provided under this clause or related data modified or enhanced under this contract shall be defined by clause I.16, Rights in Data– General (Deviation), in this contract (as modified by any applicable NASA FAR Supplement clauses).

(3) The Contractor may provide the data and information provided under this clause, and any modified or enhanced versions thereof, to subcontractors as necessary for the performance of work under this contract. Before release of the data and information provided under this clause, including and any modified or enhanced versions thereof, to such subcontractors (at any tier), the Contractor shall insert, or require the insertion of, this clause, including paragraph (f)(4), suitably modified to identify the parties as follows: references to the Government are not changed, and in all references to the Contractor the subcontractor is substituted for the Contractor so that the subcontractor has all rights and obligations of the Contractor in the clause.

(4) The Government provides the data and information provided under this clause in an “AS-IS” condition. The Government makes no warranty with respect to the serviceability

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and/or suitability of the data and information provided under this clause for contract performance.

(5) Title to or license rights. The Government shall retain title to or license rights in all data and information provided under this clause. Title to or license rights in data or information provided under this clause shall not be affected by its incorporation into or attachment to any data not owned by or licensed to the Government.

(6) Waiver of Claims and Indemnification. The Contractor agrees to waive any and all claims against the Government and shall indemnify and hold harmless the Government, its agents, and employees from every claim or liability, including attorney's fees, court costs, and expenses, arising out of, or in any way related to, the misuse or unauthorized modification, reproduction, release, performance, display, or disclosure of the data and information provided under this clause and related data by the Contractor, a subcontractor, or by any person to whom the Contractor has released or disclosed such data and information provided under this clause or related data.

(7) Flow-down of Waiver of Claims and Indemnification. The Contractor shall include this clause, suitably modified to identify the parties, in all subcontracts, regardless of tier, which involve use of the data and information provided under this clause and/or related data in any way. At all tiers, the clause shall be modified to define data and information provided under this clause as it is defined herein and to identify the parties as follows: references to the Government are not changed, and in all references to the Contractor the subcontractor is substituted for the Contractor so that the subcontractor has all rights and obligations of the Contractor in the clause. In subcontracts, at any tier, the Government, the subcontractor, and the Contractor agree that the mutual obligations of the parties created by this clause constitute a contract between the subcontractor and the Government with respect to the matters covered by the clause.

(End of Clause)

H.26 CONTRACTOR BUSINESS SYSTEMS (APPLIES TO CAS COVERED CONTRACTS ONLY)

(a) This clause only applies to covered contracts that are subject to the Cost Accounting Standards under 41 U.S.C. chapter 15, as implemented in regulations found at 48 CFR 9903.201-1 (see the FAR Appendix).

(b) Definitions. As used in this clause—

“Acceptable contractor business systems” means contractor business systems that comply with the terms and conditions of the applicable business system clauses listed in the definition of "contractor business systems" in this clause.

“Contractor business systems” means—

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(1) Accounting system, if this contract includes the clause at 252.242-7006, Accounting System Administration;

(2) Earned value management system, if this contract includes the clause at 252.234-7002, Earned Value Management System;

(3) Estimating system, if this contract includes the clause at 252.215-7002, Cost Estimating System Requirements;

(4) Material management and accounting system, if this contract includes the clause at 252.242-7004, Material Management and Accounting System;

(5) Property management system, if this contract includes the clause at 252.245-7003, Contractor Property Management System Administration; and

(6) Purchasing system, if this contract includes the clause at 252.244-7001, Contractor Purchasing System Administration.

“Significant deficiency,” in the case of a contractor business system, means a shortcoming in the system that materially affects the ability of officials of the Department of Defense to rely upon information produced by the system that is needed for management purposes.

(c) General. The Contractor shall establish and maintain acceptable business systems in accordance with the terms and conditions of this contract.

(d) Significant deficiencies.

(1) The Contractor shall respond, in writing, within 30 days to an initial determination that there are one or more significant deficiencies in one or more of the Contractor’s business systems.

(2) The Contracting Officer will evaluate the Contractor's response and notify the Contractor, in writing, of the final determination as to whether the Contractor’s business system contains significant deficiencies. If the Contracting Officer determines that the Contractor’s business system contains significant deficiencies, the final determination will include a notice to withhold payments.

(e) Withholding payments.

(1) If the Contracting Officer issues the final determination with a notice to withhold payments for significant deficiencies in a contractor business system required under this contract, the Contracting Officer will withhold five percent of amounts due from progress payments and performance-based payments, and direct the Contractor, in writing, to withhold five percent from its billings on interim cost vouchers on cost-reimbursement, labor-hour, and time-and-materials contracts until the Contracting Officer has determined that the Contractor has corrected all significant deficiencies as directed by the Contracting Officer’s final determination. The Contractor shall, within 45 days of receipt

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of the notice, either correct the deficiencies or submit an acceptable corrective action plan showing milestones and actions to eliminate the deficiencies.

(2) If the Contractor submits an acceptable corrective action plan within 45 days of receipt of a notice of the Contracting Officer's intent to withhold payments, and the Contracting Officer, in consultation with the auditor or functional specialist, determines that the Contractor is effectively implementing such plan, the Contracting Officer will reduce withholding directly related to the significant deficiencies covered under the corrective action plan, to two percent from progress payments and performance-based payments, and direct the Contractor, in writing, to reduce the percentage withheld on interim cost vouchers to two percent until the Contracting Officer determines the Contractor has corrected all significant deficiencies as directed by the Contracting Officer's final determination. However, if at any time, the Contracting Officer determines that the Contractor has failed to follow the accepted corrective action plan, the Contracting Officer will increase withholding from progress payments and performance-based payments, and direct the Contractor, in writing, to increase the percentage withheld on interim cost vouchers to the percentage initially withheld, until the Contracting Officer determines that the Contractor has corrected all significant deficiencies as directed by the Contracting Officer's final determination.

(3) Payment withhold percentage limits.

(i) The total percentage of payments withheld on amounts due under each progress payment, performance-based payment, or interim cost voucher, on this contract shall not exceed—

(A) Five percent for one or more significant deficiencies in any single contractor business system; and

(B) Ten percent for significant deficiencies in multiple contractor business systems.

(ii) If this contract contains pre-existing withholds, and the application of any subsequent payment withholds will cause withholding under this clause to exceed the payment withhold percentage limits in paragraph (e)(3)(i) of this clause, the Contracting Officer will reduce the payment withhold percentage in the final determination to an amount that will not exceed the payment withhold percentage limits.

(4) For the purpose of this clause, payment means any of the following payments authorized under this contract:

(i) Interim payments under—

(A) Cost-reimbursement contracts.

(B) Incentive type contracts.

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(C) Time-and-materials contracts.

(D) Labor-hour contracts.

(ii) Progress payments.

(iii) Performance-based payments.

(5) Payment withholding shall not apply to payments on fixed-price line items where performance is complete and the items were accepted by the Government.

(6) The withholding of any amount or subsequent payment to the Contractor shall not be construed as a waiver of any rights or remedies the Government has under this contract.

(7) Notwithstanding the provisions of any clause in this contract providing for interim, partial, or other payment withholding on any basis, the Contracting Officer may withhold payment in accordance with the provisions of this clause.

(8) The payment withholding authorized in this clause is not subject to the interest-penalty provisions of the Prompt Payment Act.

(f) Correction of deficiencies. (1) The Contractor shall notify the Contracting Officer, in writing, when the Contractor has corrected the business system's deficiencies.

(2) Once the Contractor has notified the Contracting Officer that all deficiencies have been corrected, the Contracting Officer will take one of the following actions:

(i) If the Contracting Officer determines that the Contractor has corrected all significant deficiencies as directed by the Contracting Officer's final determination, the Contracting Officer will, as appropriate, discontinue the withholding of progress payments and performance-based payments, and direct the Contractor, in writing, to discontinue the payment withholding from billings on interim cost vouchers under this contract associated with the Contracting Officer's final determination, and authorize the Contractor to bill for any monies previously withheld that are not also being withheld due to other significant deficiencies. Any payment withholding under this contract due to other significant deficiencies, will remain in effect until the Contracting Officer determines that those significant deficiencies are corrected.

(ii) If the Contracting Officer determines that the Contractor still has significant deficiencies, the Contracting Officer will continue the withholding of progress payments and performance-based payments, and the Contractor shall continue withholding amounts from its billings on interim cost vouchers in accordance with paragraph (e) of this clause, and not bill for any monies previously withheld.

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(iii) If the Contracting Officer determines, based on the evidence submitted by the Contractor, that there is a reasonable expectation that the corrective actions have been implemented and are expected to correct the significant deficiencies, the Contracting Officer will discontinue withholding payments, and release any payments previously withheld directly related to the significant deficiencies identified in the Contractor notification, and direct the Contractor, in writing, to discontinue the payment withholding from billings on interim cost vouchers associated with the Contracting Officer's final determination, and authorize the Contractor to bill for any monies previously withheld.

(iv) If, within 90 days of receipt of the Contractor notification that the Contractor has corrected the significant deficiencies, the Contracting Officer has not made a determination in accordance with paragraphs (f)(2)(i), (ii), or (iii) of this clause, the Contracting Officer will reduce withholding directly related to the significant deficiencies identified in the Contractor notification by at least 50 percent of the amount being withheld from progress payments and performance-based payments, and direct the Contractor, in writing, to reduce the payment withholding from billings on interim cost vouchers directly related to the significant deficiencies identified in the Contractor notification by a specified percentage that is at least 50 percent, but not authorize the Contractor to bill for any monies previously withheld until the Contracting Officer makes a determination in accordance with paragraphs (f)(2)(i), (ii), or (iii) of this clause.

(v) At any time after the Contracting Officer reduces or discontinues the withholding of progress payments and performance-based payments, or directs the Contractor to reduce or discontinue the payment withholding from billings on interim cost vouchers under this contract, if the Contracting Officer determines that the Contractor has failed to correct the significant deficiencies identified in the Contractor's notification, the Contracting Officer will reinstate or increase withholding from progress payments and performance-based payments, and direct the Contractor, in writing, to reinstate or increase the percentage withheld on interim cost vouchers to the percentage initially withheld, until the Contracting Officer determines that the Contractor has corrected all significant deficiencies as directed by the Contracting Officer's final determination.

(End of Clause)

PART II – CONTRACT CLAUSES**H.27 52.223-94 JSC ENVIRONMENTAL COMPLIANCE (MAR 2023) (JSC PROCUREMENT INSTRUCTION)**

(a) This clause is JSC-unique, and the requirements are in addition to any U.S. Environmental Protection Agency (EPA), U.S. Occupational Safety and Health Administration (OSHA), or other applicable federal or state regulations or statutes, including those promulgated and enforced by the Texas Commission on Environmental Quality (TCEQ), the Texas Department of State Health Services (TDSHS) and the Texas Department of Licensing and Regulation (TDLR). Therefore, the following requirements do NOT supersede but rather supplement any statutory or regulatory requirements for any entity subject to this clause.

(b) The Contractor shall comply with all applicable federal, state, and site-specific regulations, public laws, and current executive orders, as well as the following applicable NASA and Johnson Space Center site-specific permits, plans, and management directives for activities affecting human health or the environment. Johnson Space Center (JSC) includes the JSC main campus, NASA-Ellington Field (EF), Sonny Carter Training Facility (SCTF), and El Paso Forward Operating Location (EPFOL). NASA and JSC site-specific directives include, but are not limited to:

- (1) NPD 8500.1, NASA Environmental Management;
- (2) NPR 8530.1, NASA Sustainable Acquisitions;
- (3) NPR 8553.1, NASA Environmental Management Program;
- (4) NPR 8570.1, NASA Energy and Water Management Program;
- (5) NPR 8580.1, NASA National Environmental Policy Act Management Requirements;
- (6) JPD 8500.1, JSC Environmental Excellence Policy;
- (7) JPR 1040.4, JSC Emergency Preparedness Program;
- (8) JPR 1700.1, JSC Health and Safety Handbook;
- (9) JPR 8550.1, JSC Environmental Compliance Procedural Requirements
- (10) JPR 8553.1, JSC Environmental Management System Manual;
- (11) JPR 8750.1, Energy and Water Conservation Plan;
- (12) JWI 1040.26, Hazardous Substance Spill/Release Response; and
- (13) JWI 8553.1, EMS Aspect/Impact Assessment and EMP Process.

(c) "Hazardous materials," for the purposes of this clause, consist of the following:

- (1) Those "hazardous chemicals" and "extremely hazardous substances" subject to the emergency planning notification and reporting requirements in the EPA's Emergency Planning and Community Right-to-Know (EPCRA) Regulation, 40 CFR Parts 355 and 370, and counterpart TCEQ regulations without regard for quantity.
- (2) Those "hazardous substances" and "hazardous chemicals" release notification and reporting requirements under EPA's EPCRA, 40 CFR Parts 302 and 372, and counterpart TCEQ regulations, without regard for quantity.
- (3) Those materials defined as "highly hazardous chemicals" in OSHA Process

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Safety Management Regulation, 29 Code of Federal Regulation (CFR) Part 1910.119, without regard for quantity.

(4) Those industrial and hazardous wastes generated, as a result of Contractor's activities, as defined by the US EPA and TCEQ regulations, and as further defined and described in JPR 8550.1, JSC Environmental Compliance Procedural Requirements.

(5) Oil, as defined and regulated under 40 CFR 112, Spill Prevention Control and Countermeasures and counterpart TCEQ regulations.

(6) Other regulated materials (and waste) containing hazardous constituents or exhibit hazardous properties (e.g., flammable, reactive, corrosive, toxic) that are specifically identified by other statutes or regulations (e.g., PCBs, asbestos, hazardous air pollutants).

(7) Any radioisotope material or device that produces ionizing radiation.

(8) Any Class 1M, 2, 2M, 3A, 3R, 3B or 4 laser system as defined by the American National Standards Institute No. Z136.1 (most current version).

(9) Any explosive or any pyrotechnics.

(10) Any pesticide.

(d) The Contractor shall collaborate with the PIE Office and correct in a timely manner all identified environmental findings associated with its contract work (via eTrak or other authorized system), and complete, maintain, and make available to the Contracting Officer, JSC PIE Office, JSC Energy Manager, and/or regulatory agency inspection and authorized compliance audit personnel all documentation/records upon request, relating to environmental compliance (e.g., operating logs, equipment maintenance, calibration, and training records, JPR 8550.1 records, etc.) even if not routinely submitted to the respective offices listed above.

(e) Per the JSC Environmental Management System (JPR 8553.1), JSC's Planning, Integration and Environmental Office serves as the single point of contact with federal and state regulatory agencies and their representatives. The Contractor shall immediately notify the Contracting Officer and JSC Planning, Integration and Environmental Office at [REDACTED] or JSC-Environmental-[REDACTED] if contacted formally or informally by external regulatory agency representatives. The Contractor shall immediately notify the Contracting Officer and the JSC Planning, Integration and Environmental Office upon receipt of any official correspondence alleging noncompliance.

(f) Should a Notice of Violation, Notice of Noncompliance, Notice of Deficiency, or similar regulatory agency notice or enforcement action be issued to the Government on account of the actions or inactions of the Contractor or one of its subcontractors in the performance of work under this contract, the Contractor shall fully cooperate with the Government in investigating the allegations, correcting any problems, and defending against any enforcement actions arising out of such actions or inactions.

(g) The Contractor shall insert the substance of this clause, including this paragraph, with appropriate changes of designations of the parties, in subcontracts under which

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environmental requirements apply (including sustainable acquisitions and recycling/waste diversion reporting) and/or hazardous materials will be utilized, or may reasonably be expected to be utilized, onsite at JSC. The Contractor shall be responsible for tracking and ensuring the overall performance and environmental compliance of its subcontractors.

(h) In the event the Contractor fails or refuses to comply with any aspect of this clause, such failure or refusal may be considered a material breach of this contract.

(End of clause)

H.28 USDV COMMUNICATIONS

(a) The Contractor may, consistent with Federal law and this Contract, release general information regarding its activities conducted within the scope of the Contract, in accordance with the following.

- (1) The Contractor shall coordinate all responses to media inquiries and public communications efforts with NASA Communications related to its efforts on the USDV prior to release. Media inquiries related to the USDV, USDV mission, and ISS deorbit shall be directed to NASA Communications.
- (2) The Contractor shall coordinate with the NASA-designated Communications Offices (Headquarters and appropriate Center) at least seven (7) days prior to any media or public communications products (releases, advisories, and web articles), media interviews, news conferences, contingency statements, media scouts, photo opportunities and film activities regarding its USDV efforts in accordance with NASA's Media Usage and Advertising Guidelines.
- (3) The use of any direct quote by a NASA official shall be submitted to NASA Communications for concurrence to ensure accuracy and appropriateness at least three (3) days prior to its release.
- (4) If the Contractor has knowledge that the press is inquiring about an event that meets criteria set forth in NFS 1852.223-70 SAFETY AND HEALTH MEASURES AND MISHAP REPORTING (DEC 2015), the Contractor shall promptly notify the Contracting Officer, or designee, of the event. The Contracting Officer, or designee, will facilitate access to NASA Communications. NASA Communications will work with the Contractor to generate a coordinated response to the Press and the public.

(End of Clause)

[END OF SECTION]

PART II – CONTRACT CLAUSES**SECTION I - CONTRACT CLAUSES****I.1 LISTING OF CLAUSES INCORPORATED BY REFERENCE**

Clause(s) at the beginning of this Section are incorporated by reference, with the same force and effect as if they were given in full text. Clauses incorporated by reference which require a fill-in by the Government include the text of the affected paragraph(s) only. This does not limit the clause to the affected paragraph(s). The Contractor is responsible for understanding and complying with the entire clause.

The following contract clauses pertinent to this section are hereby incorporated by reference:

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)

CLAUSE NUMBER	DATE	TITLE
52.202-1	JUN 2020	DEFINITIONS
52.203-3	APR 1984	GRATUITIES
52.203-5	MAY 2014	COVENANT AGAINST CONTINGENT FEES
52.203-6	JUN 2020	RESTRICTIONS ON SUBCONTRACTOR SALES TO THE GOVERNMENT ALTERNATE I NOV 2021
52.203-7	JUN 2020	ANTI-KICKBACK PROCEDURES
52.203-8	MAY 2014	CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY
52.203-10	MAY 2014	PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY
52.203-12	JUN 2020	LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS
52.203-13	NOV 2021	CONTRACTOR CODE OF BUSINESS ETHICS AND CONDUCT
52.203-14	NOV 2021	DISPLAY OF HOTLINE POSTER(S) Fill In: Inspector General Hotline Posters may be obtained from https://oig.nasa.gov/hotline.html
52.203-17	NOV 2023	CONTRACTOR EMPLOYEE WHISTLEBLOWER RIGHTS AND REQUIREMENT TO INFORM EMPLOYEES OF WHISTLEBLOWER RIGHTS
52.203-19	JAN 2017	PROHIBITION ON REQUIRING CERTAIN INTERNAL CONFIDENTIALITY AGREEMENTS OR STATEMENTS
52.204-2	MAR 2021	SECURITY REQUIREMENTS

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CLAUSE NUMBER	DATE	TITLE
52.204-4	MAY 2011	PRINTED OR COPIED DOUBLE-SIDED ON POSTCONSUMER FIBER CONTENT PAPER
52.204-9	JAN 2011	PERSONAL IDENTITY VERIFICATION OF CONTRACTOR PERSONNEL
52.204-10	JUN 2020	REPORTING EXECUTIVE COMPENSATION AND FIRST-TIER SUBCONTRACT AWARDS
52.204-13	OCT 2018	SYSTEM FOR AWARD MANAGEMENT MAINTENANCE
52.204-18	AUG 2020	COMMERCIAL AND GOVERNMENT ENTITY CODE MAINTENANCE
52.204-19	DEC 2014	INCORPORATION BY REFERENCE OF REPRESENTATIONS AND CERTIFICATIONS
52.204-23	DEC 2023	PROHIBITION ON CONTRACTING FOR HARDWARE, SOFTWARE, AND SERVICES DEVELOPED OR PROVIDED BY KASPERSKY LAB AND OTHER COVERED ENTITIES
52.204-25	NOV 2021	PROHIBITION ON CONTRACTING FOR CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT
52.209-6	NOV 2021	PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT
52.209-9	OCT 2018	UPDATES OF PUBLICLY AVAILABLE INFORMATION REGARDING RESPONSIBILITY MATTERS
52.209-10	NOV 2015	PROHIBITION ON CONTRACTING WITH INVERTED DOMESTIC CORPORATIONS
52.210-1	NOV 2021	MARKET RESEARCH
52.211-5	AUG 2000	MATERIAL REQUIREMENTS
52.211-15	APR 2008	DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS
52.215-2	JUN 2020	AUDIT AND RECORDS-NEGOTIATION
52.215-8	OCT 1997	ORDER OF PRECEDENCE-UNIFORM CONTRACT FORMAT
52.215-10	AUG 2011	PRICE REDUCTION FOR DEFECTIVE CERTIFIED COST OR PRICING DATA

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CLAUSE NUMBER	DATE	TITLE
52.215-11	JUN 2020	PRICE REDUCTION FOR DEFECTIVE CERTIFIED COST OR PRICING DATA-MODIFICATIONS
52.215-12	JUN 2020	SUBCONTRACTOR CERTIFIED COST OR PRICING DATA
52.215-13	JUN 2020	SUBCONTRACTOR CERTIFIED COST OR PRICING DATA-MODIFICATIONS
52.215-14	NOV 2021	INTEGRITY OF UNIT PRICES
52.215-15	OCT 2010	PENSION ADJUSTMENTS AND ASSET REVERSIONS
52.215-18	JUL 2005	REVERSION OR ADJUSTMENT OF PLANS FOR POSTRETIREMENT BENEFITS (PRB) OTHER THAN PENSIONS
52.215-19	OCT 1997	NOTIFICATION OF OWNERSHIP CHANGES
52.215-21	NOV 2021	REQUIREMENTS FOR CERTIFIED COST OR PRICING DATA AND DATA OTHER THAN CERTIFIED COST OR PRICING DATA-MODIFICATIONS ALTERNATE II OCT 1997
52.219-8	FEB 2024	UTILIZATION OF SMALL BUSINESS CONCERNS
52.219-9	SEP 2023	SMALL BUSINESS SUBCONTRACTING PLAN ALTERNATE II NOV 2016
52.219-16	SEP 2021	LIQUIDATED DAMAGES-SUBCONTRACTING PLAN
52.219-28	MAR 2023	POST-AWARD SMALL BUSINESS PROGRAM REREPRESENTATION
52.222-1	FEB 1997	NOTICE TO THE GOVERNMENT OF LABOR DISPUTES
52.222-3	JUN 2003	CONVICT LABOR
52.222-4	MAY 2018	CONTRACT WORK HOURS AND SAFETY STANDARDS -OVERTIME COMPENSATION
52.222-19	FEB 2024	CHILD LABOR – COOPERATION WITH AUTHORITIES AND REMEDIES
52.222-20	JUN 2020	CONTRACTS FOR MATERIALS, SUPPLIES, ARTICLES, AND EQUIPMENT
52.222-21	APR 2015	PROHIBITION OF SEGREGATED FACILITIES
52.222-26	SEP 2016	EQUAL OPPORTUNITY
52.222-35	JUN 2020	EQUAL OPPORTUNITY FOR VETERANS
52.222-36	JUN 2020	EQUAL OPPORTUNITY FOR WORKERS WITH DISABILITIES
52.222-37	JUN 2020	EMPLOYMENT REPORTS ON VETERANS

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CLAUSE NUMBER	DATE	TITLE
52.222-40	DEC 2010	NOTIFICATION OF EMPLOYEE RIGHTS UNDER THE NATIONAL LABOR RELATIONS ACT
52.222-50	NOV 2021	COMBATING TRAFFICKING IN PERSONS ALTERNATE I MAR 2015
52.222-54	MAY 2022	EMPLOYMENT ELIGIBILITY VERIFICATION
52.223-5	MAY 2011	POLLUTION PREVENTION AND RIGHT-TO-KNOW INFORMATION
52.223-6	MAY 2001	DRUG-FREE WORKPLACE
52.223-11	JUN 2016	OZONE-DEPLETING SUBSTANCES AND HIGH GLOBAL WARMING POTENTIAL HYDROFLUOROCARBONS
52.223-18	JUN 2020	ENCOURAGING CONTRACTOR POLICIES TO BAN TEXT MESSAGING WHILE DRIVING
52.224-1	APR 1984	PRIVACY ACT NOTIFICATION
52.224-2	APR 1984	PRIVACY ACT
52.224-3	JAN 2017	PRIVACY TRAINING
52.225-1	OCT 2022	BUY AMERICAN-SUPPLIES ALTERNATE I OCT 2022
52.225-8	OCT 2010	DUTY-FREE ENTRY
52.225-13	FEB 2021	RESTRICTIONS ON CERTAIN FOREIGN PURCHASES
52.227-1	JUN 2020	AUTHORIZATION AND CONSENT
52.227-2	JUN 2020	NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT
52.227-3	APR 1984	PATENT INDEMNITY
52.227-11	MAY 2014	PATENT RIGHTS-OWNERSHIP BY THE CONTRACTOR
52.227-16	JUN 1987	ADDITIONAL DATA REQUIREMENTS
52.227-21	MAY 2014	TECHNICAL DATA DECLARATION, REVISION, AND WITHHOLDING OF PAYMENT-MAJOR SYSTEMS
52.227-22	JUN 1987	MAJOR SYSTEM-MINIMUM RIGHTS
52.229-3	FEB 2013	FEDERAL, STATE, AND LOCAL TAXES <i>(Applies to FFP only)</i>
52.232-1	APR 1984	PAYMENTS <i>(Applies to FFP only)</i>
52.232-8	FEB 2002	DISCOUNTS FOR PROMPT PAYMENT
52.232-11	APR 1984	EXTRAS <i>(Applies to FFP only)</i>
52.232-17	MAY 2014	INTEREST
52.232-23	MAY 2014	ASSIGNMENT OF CLAIMS
52.232-25	JAN 2017	PROMPT PAYMENT ALTERNATE I FEB 2002

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CLAUSE NUMBER	DATE	TITLE
52.232-33	OCT 2018	PAYMENT BY ELECTRONIC FUNDS TRANSFER-SYSTEM FOR AWARD MANAGEMENT
52.232-39	JUN 2013	UNENFORCEABILITY OF UNAUTHORIZED OBLIGATIONS
52.232-40	MAR 2023	PROVIDING ACCELERATED PAYMENTS TO SMALL BUSINESS SUBCONTRACTORS
52.233-1	MAY 2014	DISPUTES ALTERNATE I DEC 1991
52.233-3	AUG 1996	PROTEST AFTER AWARD ALTERNATE I JUN 1985
52.233-4	OCT 2004	APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM
52.234-1	SEP 2016	INDUSTRIAL RESOURCES DEVELOPED UNDER TITLE III, DEFENSE PRODUCTION ACT
52.236-13	NOV 1991	ACCIDENT PREVENTION ALTERNATE I (NOV 1991)
52.237-2	APR 1984	PROTECTION OF GOVERNMENT BUILDINGS, EQUIPMENT, AND VEGETATION
52.239-1	AUG 1996	PRIVACY OR SECURITY SAFEGUARDS
52.242-5	JAN 2017	PAYMENTS TO SMALL BUSINESS SUBCONTRACTORS
52.242-13	JUL 1995	BANKRUPTCY
52.243-1	AUG 1987	CHANGES-FIXED-PRICE ALTERNATE V (APR 1984) (<i>Applies to FFP only</i>)
52.243-6	APR 1984	CHANGE ORDER ACCOUNTING
52.243-7	JAN 2017	NOTIFICATION OF CHANGES Fill in paragraph (b): “14 calendar days for items Fill in paragraph (d): “14 calendar days after receipt of all (b) 1 through 6 elements”
52.244-2	JUN 2020	SUBCONTRACTS Fill in paragraph (d): “None” Fill in paragraph (j): “None”
52.244-5	DEC 1996	COMPETITION IN SUBCONTRACTING
52.244-6	FEB 2024	SUBCONTRACTS FOR COMMERCIAL PRODUCTS AND COMMERCIAL SERVICES
52.245-1	SEP 2021	GOVERNMENT PROPERTY
52.245-9	APR 2012	USE AND CHARGES
52.246-24	FEB 1997	LIMITATION OF LIABILITY-HIGH-VALUE ITEMS
52.246-25	FEB 1997	LIMITATION OF LIABILITY-SERVICES

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CLAUSE NUMBER	DATE	TITLE
52.246-26	NOV 2021	REPORTING NONCONFORMING ITEMS
52.247-63	JUN 2003	PREFERENCE FOR US-FLAG AIR CARRIERS
52.248-1	JUN 2020	VALUE ENGINEERING
52.249-2	APR 2012	TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) <i>(Applies to FFP only)</i>
52.249-8	APR 1984	DEFAULT (FIXED-PRICE SUPPLY AND SERVICE) <i>(Applies to FFP only)</i>
52.249-14	APR 1984	EXCUSABLE DELAYS
52.253-1	JAN 1991	COMPUTER GENERATED FORMS

II. NASA FAR SUPPLEMENT (48 CFR CHAPTER 18)

CLAUSE NUMBER	DATE	TITLE
1852.203-70	JUN 200	DISPLAY OF INSPECTOR GENERAL HOTLINE POSTERS
1852.203-71	AUG 2014	REQUIREMENT TO INFORM EMPLOYEES OF WHISTLEBLOWER RIGHTS
1852.215-84	NOV 2023	OMBUDSMAN
1852.216-89	AUG 2016	ASSIGNMENT AND RELEASE FORMS
1852.219-75	APR 2015	INDIVIDUAL SUBCONTRACTING REPORTS
1852.219-77	OCT 2023	NASA MENTOR-PROTÉGÉ PROGRAM
1852.219-79	OCT 2023	MENTOR REQUIREMENTS AND EVALUATION
1852.223-74	OCT 2023	DRUG- AND ALCOHOL-FREE WORKFORCE
1852.227-11	APR 2015	PATENT RIGHTS--OWNERSHIP BY THE CONTRACTOR
1852.227-88	APR 2015	GOVERNMENT-FURNISHED COMPUTER SOFTWARE AND RELATED TECHNICAL DATA.
1852.228-75	OCT 1988	MINIMUM INSURANCE COVERAGE
1852.235-70	DEC 2006	CENTER FOR AEROSPACE INFORMATION
1852.237-70	DEC 1988	EMERGENCY EVACUATION PROCEDURES
1852.237-72	JUN 2005	ACCESS TO SENSITIVE INFORMATION
1852.237-73	JUN 2005	RELEASE OF SENSITIVE INFORMATION
1852.242-78	APR 2001	EMERGENCY MEDICAL SERVICES AND EVACUATION
1852.246-74	OCT 2023	CONTRACTOR COUNTERFEIT ELECTRONIC PART DETECTION AND AVOIDANCE

(End of Clauses Incorporated by Reference)

PART II – CONTRACT CLAUSES**I.2 FAR 52.204-21 BASIC SAFEGUARDING OF COVERED CONTRACTOR INFORMATION SYSTEMS. (NOV 2021)**

(a) *Definitions.* As used in this clause -

Covered contractor information system means an information system that is owned or operated by a contractor that processes, stores, or transmits Federal contract information.

Federal contract information means information, not intended for public release, that is provided by or generated for the Government under a contract to develop or deliver a product or service to the Government, but not including information provided by the Government to the public (such as on public Web sites) or simple transactional information, such as necessary to process payments.

Information means any communication or representation of knowledge such as facts, data, or opinions, in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audiovisual (Committee on National Security Systems Instruction (CNSSI) 4009).

Information system means a discrete set of information resources organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of information (44 U.S.C. 3502).

Safeguarding means measures or controls that are prescribed to protect information systems.

(b) *Safeguarding requirements and procedures.* (1) The Contractor shall apply the following basic safeguarding requirements and procedures to protect covered contractor information systems. Requirements and procedures for basic safeguarding of covered contractor information systems shall include, at a minimum, the following security controls:

- (i) Limit information system access to authorized users, processes acting on behalf of authorized users, or devices (including other information systems).
- (ii) Limit information system access to the types of transactions and functions that authorized users are permitted to execute.
- (iii) Verify and control/limit connections to and use of external information systems.
- (iv) Control information posted or processed on publicly accessible information systems.
- (v) Identify information system users, processes acting on behalf of users, or devices.
- (vi) Authenticate (or verify) the identities of those users, processes, or devices, as a prerequisite to allowing access to organizational information systems.
- (vii) Sanitize or destroy information system media containing Federal Contract Information before disposal or release for reuse.
- (viii) Limit physical access to organizational information systems, equipment, and the respective operating environments to authorized individuals.
- (ix) Escort visitors and monitor visitor activity; maintain audit logs of physical access; and control and manage physical access devices.

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- (x) Monitor, control, and protect organizational communications (*i.e.*, information transmitted or received by organizational information systems) at the external boundaries and key internal boundaries of the information systems.
- (xi) Implement subnetworks for publicly accessible system components that are physically or logically separated from internal networks.
- (xii) Identify, report, and correct information and information system flaws in a timely manner.
- (xiii) Provide protection from malicious code at appropriate locations within organizational information systems.
- (xiv) Update malicious code protection mechanisms when new releases are available.
- (xv) Perform periodic scans of the information system and real-time scans of files from external sources as files are downloaded, opened, or executed.

(2) *Other requirements.* This clause does not relieve the Contractor of any other specific safeguarding requirements specified by Federal agencies and departments relating to covered contractor information systems generally or other Federal safeguarding requirements for controlled unclassified information (CUI) as established by Executive Order 13556.

(c) *Subcontracts.* The Contractor shall include the substance of this clause, including this paragraph (c), in subcontracts under this contract (including subcontracts for the acquisition of commercial products or commercial services, other than commercially available off-the-shelf items), in which the subcontractor may have Federal contract information residing in or transiting through its information system.

(End of clause)

I.3 FAR 52.204-27 PROHIBITION ON A BYTEDANCE COVERED APPLICATION

(a) Definitions. As used in this clause—

Covered application means the social networking service TikTok or any successor application or service developed or provided by ByteDance Limited, or an entity owned by ByteDance Limited.

Information technology, as defined in 40 U.S.C. 11101(6)—

(1) Means any equipment or interconnected system or subsystem of equipment, used in the automatic acquisition, storage, analysis, evaluation, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the executive agency, if the equipment is used by the executive agency directly or is used by a contractor under a contract with the executive agency that requires the use—

(i) Of that equipment; or

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(ii) Of that equipment to a significant extent in the performance of a service or the furnishing of a product;

(2) Includes computers, ancillary equipment (including imaging peripherals, input, output, and storage devices necessary for security and surveillance), peripheral equipment designed to be controlled by the central processing unit of a computer, software, firmware and similar procedures, services (including support services), and related resources; but

(3) Does not include any equipment acquired by a Federal contractor incidental to a Federal contract.

(b) Prohibition. Section 102 of Division R of the Consolidated Appropriations Act, 2023 (Pub. L. 117-328), the No TikTok on Government Devices Act, and its implementing guidance under Office of Management and Budget (OMB) Memorandum M-23-13, dated February 27, 2023, “No TikTok on Government Devices” Implementation Guidance, collectively prohibit the presence or use of a covered application on executive agency information technology, including certain equipment used by Federal contractors. The Contractor is prohibited from having or using a covered application on any information technology owned or managed by the Government, or on any information technology used or provided by the Contractor under this contract, including equipment provided by the Contractor’s employees; however, this prohibition does not apply if the Contracting Officer provides written notification to the Contractor that an exception has been granted in accordance with OMB Memorandum M-23-13.

(c) Subcontracts. The Contractor shall insert the substance of this clause, including this paragraph (c), in all subcontracts, including subcontracts for the acquisition of commercial products or commercial services.

(End of clause)

I.4 RESERVED

I.5 FAR 52.216-18 ORDERING. (AUG 2020)

(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from contract award through **March 31, 2031**.

(b) All delivery orders or task orders are subject to the terms and conditions of this contract. In the event of conflict between a delivery order or task order and this contract, the contract shall control.

(c) A delivery order or task order is considered “issued” when -

(1) If sent by mail (includes transmittal by U.S. mail or private delivery service), the Government deposits the order in the mail;

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- (2) If sent by fax, the Government transmits the order to the Contractor's fax number; or
- (3) If sent electronically, the Government either -
 - (i) Posts a copy of the delivery order or task order to a Government document access system, and notice is sent to the Contractor; or
 - (ii) Distributes the delivery order or task order via email to the Contractor's email address.

(d) Orders may be issued by methods other than those enumerated in this clause only if authorized in the contract.

(End of clause)

I.6 FAR 52.216-19 ORDER LIMITATIONS. (OCT 1995)

(a) *Minimum order.* When the Government requires supplies or services covered by this contract in an amount of less than \$100,000, the Government is not obligated to purchase, nor is the Contractor obligated to furnish, those supplies or services under the contract.

- (b) *Maximum order.* The Contractor is not obligated to honor -
- (1) Any order for a single item in excess of \$150M;
 - (2) Any order for a combination of items in excess of \$302M or
 - (3) A series of orders from the same ordering office within 90 calendar days that together call for quantities exceeding the limitation in subparagraph (1) or (2) above.

(c) If this is a requirements contract (i.e., includes the Requirements clause at subsection 52.216-21 of the Federal Acquisition Regulation (FAR)), the Government is not required to order a part of any one requirement from the Contractor if that requirement exceeds the maximum-order limitations in paragraph (b) above.

(d) Notwithstanding paragraphs (b) and (c) above, the Contractor shall honor any order exceeding the maximum order limitations in paragraph (b), unless that order (or orders) is returned to the ordering office within 14 calendar days after issuance, with written notice stating the Contractor's intent not to ship the item (or items) called for and the reasons. Upon receiving this notice, the Government may acquire the supplies or services from another source.

(End of clause)

I.7 FAR 52.216-22 INDEFINITE QUANTITY. (OCT 1995)

- (a) This is an indefinite-quantity contract for the supplies or services specified, and effective for the period stated, in the Schedule. The quantities of supplies and services specified in the Schedule are estimates only and are not purchased by this contract.
- (b) Delivery or performance shall be made only as authorized by orders issued in accordance with the Ordering clause. The Contractor shall furnish to the Government, when and if ordered, the supplies or services specified in the Schedule up to and including the quantity designated in the Schedule as the *maximum*. The Government shall order at least the quantity of supplies or services designated in the Schedule as the *minimum*.

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(d) Except for any limitations on quantities in the Order Limitations clause or in the Schedule, there is no limit on the number of orders that may be issued. The Government may issue orders requiring delivery to multiple destinations or performance at multiple locations.

(d) Any order issued during the effective period of this contract and not completed within that period shall be completed by the Contractor within the time specified in the order. The contract shall govern the Contractor's and Government's rights and obligations with respect to that order to the same extent as if the order were completed during the contract's effective period; *provided*, that the Contractor shall not be required to make any deliveries under this contract after 24 months after the end of the ordering period stated in Section I, Clause I.5, FAR 52.216-18, *Ordering*.

(End of clause)

I.8 FAR 52.217-7 OPTION FOR INCREASED QUANTITY - SEPARATELY PRICED LINE ITEM (CLIN 2A CRITICAL SPARES) (MAR 1989)

The Government may require the delivery under CLIN2 a set of critical spares that are long-lead items required to support a Government order for a second USDV (e.g. in a contingency where the first USDV is lost due to a launch failure) to be delivered to the launch site processing facility, accepted by the Government and ready to launch within two (2) years.

The option includes all required labor and non-labor resources to have these long-lead critical spares assembled, tested, qualified, accepted and available on the shelf to support a Government order for a second USDV to be delivered to the launch site processing facility, accepted and ready to launch within two (2) year.

The Contracting Officer may exercise the option by written notice to the Contractor within 2 years of contract award.

If this option is exercised, Attachment J-40, Deliverable Item List will be modified to include the following critical spare deliverables.

DIL Number	Description/Nomenclature	Part Number	Qty	Unit of Issue	Hwd Type	Destination	Due Date
Option2A-1	Helium Pressurant Tank	TBD	6	EA	Propulsion	Contractor Bonded Storage (DD-250 Acceptance In Place)	ATP + 23 months
Option2A-2	Propellant Tank, Orbit	TBD	10	EA	Propulsion	Contractor Bonded Storage	ATP + 23 months

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						(DD-250 Acceptance In Place)	
Option2A-3	Propellant Tank, Landing	TBD	36	EA	Propulsion	Contractor Bonded Storage (DD-250 Acceptance In Place)	ATP + 23 months
Option2A-4	Draco Thruster Assy, Mid, Quad 1	TBD	16	EA	Propulsion	Contractor Bonded Storage (DD-250 Acceptance In Place)	ATP + 23 months
Option2A-5	D2 Draco Thruster Assy, Forward Bulkhead, C208+	TBD	30	EA	Propulsion	Contractor Bonded Storage (DD-250 Acceptance In Place)	ATP + 23 months

*Date shall be no later than date specified in Clause F.3 *FAR 52-211-9 DESIRED AND REQUIRED TIME OF DELIVERY*

If this option is exercised, Attachment J-30, Work Plans will be modified to include the following milestone delivery schedule. (Applies to FFP Only)

Option 2A Critical Spares (FFP) Payment Milestones	Payment Percent per Milestone	Contractual Due Date (Assignment +/- Months)	Contractual Due Date (Calendar Date)
Milestone 1 - Authority to Proceed - Delivery of Project Baseline Schedule	10%	CLIN 2A Option ATP + 0.5 months	TBD calendar date filled in by CO at CLIN 2A Option ATP (if exercised)
Milestone 2 – Complete contractual agreements/purchase orders – Deliver completion evidence of	30%	CLIN 2A Option ATP + 3 months	TBD calendar date filled in by CO at CLIN 2A Option ATP (if exercised)

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procurement of all the critical spare parts with planned on-dock delivery dates.			
Milestone 3 – Government Acceptance of Critical Spares - Completion evidence demonstrating all critical spares are assembled, tested, qualified, accepted and in contractor bonded storage. Completion and NASA acceptance of DD-250 with Certificate of Conformance for each Critical Spare that notes location of Acceptance Data of each critical spare that is available for NASA retrieval and download in accordance with USDV Acceptance Data (DRD USDV-36).	60%	CLIN 2A Option ATP + 23 months**	TBD calendar date filled in by CO at CLIN 2A Option ATP (if exercised)**

**Date shall be no later than Offeror's proposed date specified in Clause F.3 *FAR 52-211-9* DESIRED AND REQUIRED TIME OF DELIVERY

(End of clause)

I.9 FAR 52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (OCT 2022)

(a) Evaluation preference. (1) Offers will be evaluated by adding a factor of 10 percent to the price of all offers, except -

(i) Offers from HUBZone small business concerns that have not waived the evaluation preference; and

(ii) Otherwise successful offers from small business concerns.

(2) The factor of 10 percent shall be applied on a line-item basis or to any group of items on which award may be made. Other evaluation factors described in the solicitation shall be applied before application of the factor.

(3) When the two highest rated offerors are a HUBZone small business concern and a large business, and the evaluated offer of the HUBZone small business concern is equal

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to the evaluated offer of the large business after considering the price evaluation preference, award will be made to the HUBZone small business concern.

(b) *Waiver of evaluation preference.* A HUBZone small business concern may elect to waive the evaluation preference, in which case the factor will be added to its offer for evaluation purposes.

Offeror elects to waive the evaluation preference.

(c) *Joint venture.* A HUBZone joint venture agrees that, in the performance of the contract, at least 40 percent of the aggregate work performed by the joint venture shall be completed by the HUBZone small business parties to the joint venture. Work performed by the HUBZone small business parties to the joint venture must be more than administrative functions.

(End of clause)

I.10 RESERVED**I.11 FAR 52.222-35 EQUAL OPPORTUNITY FOR VETERANS. (JUN 2020)**

(a) *Definitions.* As used in this clause -

“Active duty wartime or campaign badge veteran,” “Armed Forces service medal veteran,” “disabled veteran,” “protected veteran,” “qualified disabled veteran,” and “recently separated veteran” have the meanings given at Federal Acquisition Regulation (FAR) 22.1301.

(b) *Equal opportunity clause.* The Contractor shall abide by the requirements of the equal opportunity clause at 41 CFR 60-300.5(a), as of March 24, 2014. This clause prohibits discrimination against qualified protected veterans, and requires affirmative action by the Contractor to employ and advance in employment qualified protected veterans.

(c) *Subcontracts.* The Contractor shall insert the terms of this clause in subcontracts valued at or above the threshold specified in FAR 22.1303(a) on the date of subcontract award, unless exempted by rules, regulations, or orders of the Secretary of Labor. The Contractor shall act as specified by the Director, Office of Federal Contract Compliance Programs, to enforce the terms, including action for noncompliance. Such necessary changes in language may be made as shall be appropriate to identify properly the parties and their undertakings.

(End of clause)

I.12 FAR 52.222-36 EQUAL OPPORTUNITY FOR WORKERS WITH DISABILITIES. (JUN 2020)

(a) *Equal opportunity clause.* The Contractor shall abide by the requirements of the equal opportunity clause at 41 CFR 60-741.5(a), as of March 24, 2014. This clause prohibits discrimination against qualified individuals on the basis of disability, and requires affirmative action by the Contractor to employ and advance in employment qualified individuals with disabilities.

(b) *Subcontracts.* The Contractor shall include the terms of this clause in every subcontract or purchase order in excess of the threshold specified in Federal Acquisition Regulation (FAR)

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22.1408(a) on the date of subcontract award, unless exempted by rules, regulations, or orders of the Secretary, so that such provisions will be binding upon each subcontractor or vendor. The Contractor shall act as specified by the Director, Office of Federal Contract Compliance Programs of the U.S. Department of Labor, to enforce the terms, including action for noncompliance. Such necessary changes in language may be made as shall be appropriate to identify properly the parties and their undertakings.

(End of clause)

I.13 FAR 52.232-19 AVAILABILITY OF FUNDS FOR THE NEXT FISCAL YEAR. (APR 1984)

Funds are not presently available for performance under this contract beyond September 30, 2025. The Government's obligation for performance of this contract beyond that date is contingent upon the availability of appropriated funds from which payment for contract purposes can be made. No legal liability on the part of the Government for any payment may arise for performance under this contract beyond September 30, 2025, until funds are made available to the Contracting Officer for performance and until the Contractor receives notice of availability, to be confirmed in writing by the Contracting Officer.

(End of clause)

I.14 FAR 52.232-32 PERFORMANCE-BASED PAYMENTS. (APR 2012)

(a) *Amount of payments and limitations on payments.* Subject to such other limitations and conditions as are specified in this contract and this clause, the amount of payments and limitations on payments shall be specified in the contract's description of the basis for payment.

(b) *Contractor request for performance-based payment.* The Contractor may submit requests for payment of performance-based payments not more frequently than monthly, in a form and manner acceptable to the Contracting Officer. Unless otherwise authorized by the Contracting Officer, all performance-based payments in any period for which payment is being requested shall be included in a single request, appropriately itemized and totaled. The Contractor's request shall contain the information and certification detailed in paragraphs (l) and (m) of this clause.

(c) *Approval and payment of requests.* (1) The Contractor shall not be entitled to payment of a request for performance-based payment prior to successful accomplishment of the event or performance criterion for which payment is requested. The Contracting Officer shall determine whether the event or performance criterion for which payment is requested has been successfully accomplished in accordance with the terms of the contract. The Contracting Officer may, at any time, require the Contractor to substantiate the successful performance of any event or performance criterion which has been or is represented as being payable.

(2) A payment under this performance-based payment clause is a contract financing payment under the Prompt Payment clause of this contract and not subject to the interest penalty provisions of the Prompt Payment Act. The designated payment office will pay approved requests on the 30th day after receipt of the request for performance-based payment by the designated payment office. However, the designated payment office is not required to provide payment if the Contracting Officer requires substantiation as provided in paragraph (c)(1) of this clause, or inquires into the status of an event or

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performance criterion, or into any of the conditions listed in paragraph (a) of this clause, or into the Contractor certification. The payment period will not begin until the Contracting Officer approves the request.

(3) The approval by the Contracting Officer of a request for performance-based payment does not constitute an acceptance by the Government and does not excuse the Contractor from performance of obligations under this contract.

(d) *Liquidation of performance-based payments.* (1) Performance-based finance amounts paid prior to payment for delivery of an item shall be liquidated by deducting a percentage or a designated dollar amount from the delivery payment. If the performance-based finance payments are on a delivery item basis, the liquidation amount for each such line item shall be the percent of that delivery item price that was previously paid under performance-based finance payments or the designated dollar amount. If the performance-based finance payments are on a whole contract basis, liquidation shall be by either predesignated liquidation amounts or a liquidation percentage.

(2) If at any time the amount of payments under this contract exceeds any limitation in this contract, the Contractor shall repay to the Government the excess. Unless otherwise determined by the Contracting Officer, such excess shall be credited as a reduction in the unliquidated performance-based payment balance(s), after adjustment of invoice payments and balances for any retroactive price adjustments.

(e) *Reduction or suspension of performance-based payments.* The Contracting Officer may reduce or suspend performance-based payments, liquidate performance-based payments by deduction from any payment under the contract, or take a combination of these actions after finding upon substantial evidence any of the following conditions:

(1) The Contractor failed to comply with any material requirement of this contract (which includes paragraphs (h) and (i) of this clause).

(2) Performance of this contract is endangered by the Contractor's (i) failure to make progress, or (ii) unsatisfactory financial condition.

(3) The Contractor is delinquent in payment of any subcontractor or supplier under this contract in the ordinary course of business.

(f) *Title.* (1) Title to the property described in this paragraph (f) shall vest in the Government. Vestiture shall be immediately upon the date of the first performance-based payment under this contract, for property acquired or produced before that date. Otherwise, vestiture shall occur when the property is or should have been allocable or properly chargeable to this contract.

(2) *Property*, as used in this clause, includes all of the following described items acquired or produced by the Contractor that are or should be allocable or properly chargeable to this contract under sound and generally accepted accounting principles and practices:

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(i) Parts, materials, inventories, and work in process;

(ii) Special tooling and special test equipment to which the Government is to acquire title;

(iii) Nondurable (i.e., noncapital) tools, jigs, dies, fixtures, molds, patterns, taps, gauges, test equipment and other similar manufacturing aids, title to which would not be obtained as special tooling under subparagraph (f)(2)(ii) of this clause; and

(iv) Drawings and technical data, to the extent the Contractor or subcontractors are required to deliver them to the Government by other clauses of this contract.

(3) Although title to property is in the Government under this clause, other applicable clauses of this contract (e.g., the termination clauses) shall determine the handling and disposition of the property.

(4) The Contractor may sell any scrap resulting from production under this contract, without requesting the Contracting Officer's approval, provided that any significant reduction in the value of the property to which the Government has title under this clause is reported in writing to the Contracting Officer.

(5) In order to acquire for its own use or dispose of property to which title is vested in the Government under this clause, the Contractor shall obtain the Contracting Officer's advance approval of the action and the terms. If approved, the basis for payment (the events or performance criteria) to which the property is related shall be deemed to be not in compliance with the terms of the contract and not payable (if the property is part of or needed for performance), and the Contractor shall refund the related performance-based payments in accordance with paragraph (d) of this clause.

(6) When the Contractor completes all of the obligations under this contract, including liquidation of all performance-based payments, title shall vest in the Contractor for all property (or the proceeds thereof) not -

(i) Delivered to, and accepted by, the Government under this contract; or

(ii) Incorporated in supplies delivered to, and accepted by, the Government under this contract and to which title is vested in the Government under this clause.

(7) The terms of this contract concerning liability for Government-furnished property shall not apply to property to which the Government acquired title solely under this clause.

(g) *Risk of loss.* Before delivery to and acceptance by the Government, the Contractor shall bear the risk of loss for property, the title to which vests in the Government under this clause, except to the extent the Government expressly assumes the risk. If any property is lost (see 45.101), the basis of payment (the events or performance criteria) to which the property is related shall be deemed to be not in compliance with the terms of the contract and not payable (if the property is

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part of or needed for performance), and the Contractor shall refund the related performance-based payments in accordance with paragraph (d) of this clause.

(h) *Records and controls.* The Contractor shall maintain records and controls adequate for administration of this clause. The Contractor shall have no entitlement to performance-based payments during any time the Contractor's records or controls are determined by the Contracting Officer to be inadequate for administration of this clause.

(i) *Reports and Government access.* The Contractor shall promptly furnish reports, certificates, financial statements, and other pertinent information requested by the Contracting Officer for the administration of this clause and to determine that an event or other criterion prompting a financing payment has been successfully accomplished. The Contractor shall give the Government reasonable opportunity to examine and verify the Contractor's records and to examine and verify the Contractor's performance of this contract for administration of this clause.

(j) *Special terms regarding default.* If this contract is terminated under the Default clause, (1) the Contractor shall, on demand, repay to the Government the amount of unliquidated performance-based payments, and (2) title shall vest in the Contractor, on full liquidation of all performance-based payments, for all property for which the Government elects not to require delivery under the Default clause of this contract. The Government shall be liable for no payment except as provided by the Default clause.

(k) *Reservation of rights.*

(1) No payment or vesting of title under this clause shall (i) excuse the Contractor from performance of obligations under this contract, or (ii) constitute a waiver of any of the rights or remedies of the parties under the contract.

(2) The Government's rights and remedies under this clause (i) shall not be exclusive, but rather shall be in addition to any other rights and remedies provided by law or this contract, and (ii) shall not be affected by delayed, partial, or omitted exercise of any right, remedy, power, or privilege, nor shall such exercise or any single exercise preclude or impair any further exercise under this clause or the exercise of any other right, power, or privilege of the Government.

(l) *Content of Contractor's request for performance-based payment.* The Contractor's request for performance-based payment shall contain the following:

(1) The name and address of the Contractor;

(2) The date of the request for performance-based payment;

(3) The contract number and/or other identifier of the contract or order under which the request is made;

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(4) Such information and documentation as is required by the contract's description of the basis for payment; and

(5) A certification by a Contractor official authorized to bind the Contractor, as specified in paragraph (m) of this clause.

(m) *Content of Contractor's certification.* As required in paragraph (l)(5) of this clause, the Contractor shall make the following certification in each request for performance-based payment:

I certify to the best of my knowledge and belief that -

(1) This request for performance-based payment is true and correct; this request (and attachments) has been prepared from the books and records of the Contractor, in accordance with the contract and the instructions of the Contracting Officer;

(2) (Except as reported in writing on _____), all payments to subcontractors and suppliers under this contract have been paid, or will be paid, currently, when due in the ordinary course of business;

(3) There are no encumbrances (except as reported in writing on _____) against the property acquired or produced for, and allocated or properly chargeable to, the contract which would affect or impair the Government's title;

(4) There has been no materially adverse change in the financial condition of the Contractor since the submission by the Contractor to the Government of the most recent written information dated _____; and

(5) After the making of this requested performance-based payment, the amount of all payments for each deliverable item for which performance-based payments have been requested will not exceed any limitation in the contract, and the amount of all payments under the contract will not exceed any limitation in the contract.

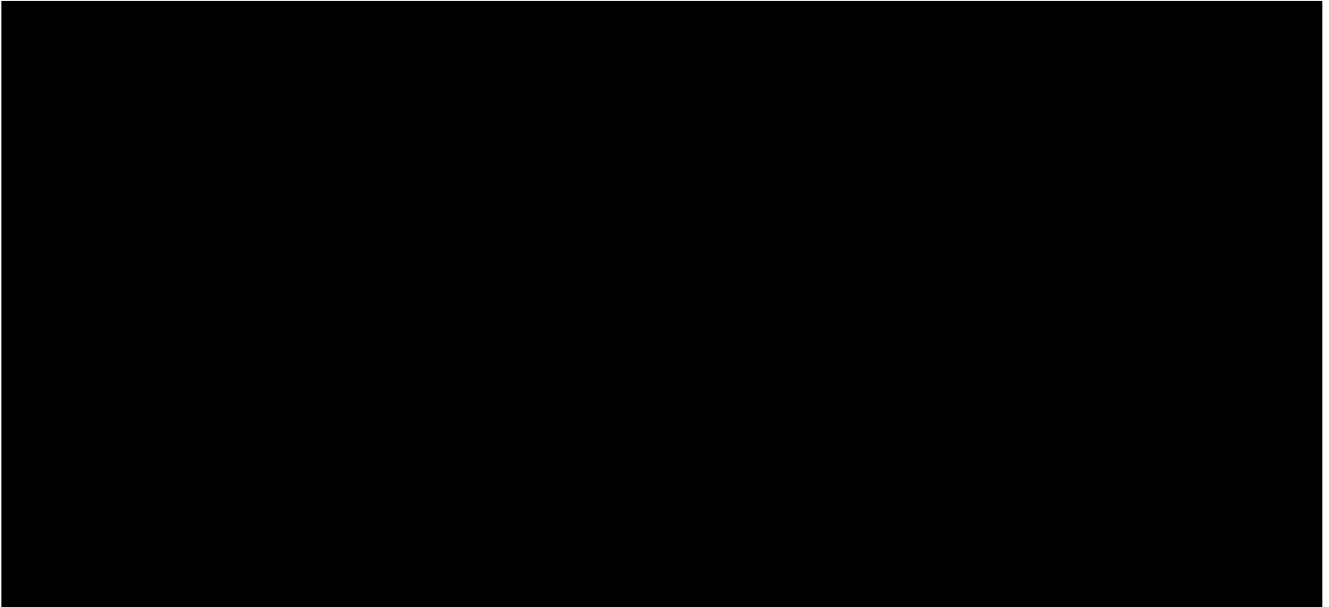
(End of clause)

I.15 FAR 52.223-3 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA (FEB 2021) (ALTERNATE I) (JUL 1995)

(a) *Hazardous material*, as used in this clause, includes any material defined as hazardous under the latest version of Federal Standard No. 313 (including revisions adopted during the term of the contract).

(b) The offeror must list any hazardous material, as defined in paragraph (a) of this clause, to be delivered under this contract. The hazardous material shall be properly identified and include any applicable identification number, such as National Stock Number or Special Item Number. This information shall also be included on the Material Safety Data Sheet submitted under this contract.

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(c) This list must be updated during performance of the contract whenever the Contractor determines that any other material to be delivered under this contract is hazardous.

(d) The apparently successful offeror agrees to submit, for each item as required prior to award, a Material Safety Data Sheet, meeting the requirements of 29 CFR 1910.1200(g) and the latest version of Federal Standard No. 313, for all hazardous material identified in paragraph (b) of this clause. Data shall be submitted in accordance with Federal Standard No. 313, whether or not the apparently successful offeror is the actual manufacturer of these items. Failure to submit the Material Safety Data Sheet prior to award may result in the apparently successful offeror being considered nonresponsible and ineligible for award.

(e) If, after award, there is a change in the composition of the item(s) or a revision to Federal Standard No. 313, which renders incomplete or inaccurate the data submitted under paragraph (d) of this clause, the Contractor shall promptly notify the Contracting Officer and resubmit the data.

(f) Neither the requirements of this clause nor any act or failure to act by the Government shall relieve the Contractor of any responsibility or liability for the safety of Government, Contractor, or subcontractor personnel or property.

(g) Nothing contained in this clause shall relieve the Contractor from complying with applicable Federal, State, and local laws, codes, ordinances, and regulations (including the obtaining of licenses and permits) in connection with hazardous material.

(h) The Government's rights in data furnished under this contract with respect to hazardous material are as follows:

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(1) To use, duplicate and disclose any data to which this clause is applicable. The purposes of this right are to -

(i) Apprise personnel of the hazards to which they may be exposed in using, handling, packaging, transporting, or disposing of hazardous materials;

(ii) Obtain medical treatment for those affected by the material; and

(iii) Have others use, duplicate, and disclose the data for the Government for these purposes.

(2) To use, duplicate, and disclose data furnished under this clause, in accordance with subparagraph (h)(1) of this clause, in precedence over any other clause of this contract providing for rights in data.

(3) The Government is not precluded from using similar or identical data acquired from other sources.

(i) Except as provided in paragraph (i)(2) the Contractor shall prepare and submit a sufficient number of Material Safety Data Sheets (MSDS's), meeting the requirements of 29 CFR 1910.1200(g) and the latest version of Federal Standard No. 313, for all hazardous materials identified in paragraph (b) of this clause.

(1) For items shipped to consignees, the Contractor shall include a copy of the MSDS with the packing list or other suitable shipping document which accompanies each shipment. Alternatively, the Contractor is permitted to transmit MSDS's to consignees in advance of receipt of shipments by consignees, if authorized in writing by the Contracting Officer.

(2) For items shipped to consignees identified by mailing address as agency depots, distribution centers or customer supply centers, the Contractor shall provide one copy of the MSDS's in or on each shipping container. If affixed to the outside of each container, the MSDS must be placed in a weather resistant envelope.

(End of clause)

I.16 FAR 52.227-14 RIGHTS IN DATA—GENERAL (MAY 2014) ALTERNATE II (DEC 2007) [(MODIFIED BY NFS 1852.227-14 (APR 2015)] ALTERNATE III (DEC 2007) ALTERNATE V (DEC 2007)

(a) *Definitions.* As used in this clause—

Computer database or *database* means a collection of recorded information in a form capable of, and for the purpose of, being stored in, processed, and operated on by a computer. The term does not include computer software.

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Computer software— (1) Means (i) Computer programs that comprise a series of instructions, rules, routines, or statements, regardless of the media in which recorded, that allow or cause a computer to perform a specific operation or series of operations; and

(ii) Recorded information comprising source code listings, design details, algorithms, processes, flow charts, formulas, and related material that would enable the computer program to be produced, created, or compiled.

(2) Does not include computer databases or computer software documentation.

Computer software documentation means owner's manuals, user's manuals, installation instructions, operating instructions, and other similar items, regardless of storage medium, that explain the capabilities of the computer software or provide instructions for using the software.

Data means recorded information, regardless of form or the media on which it may be recorded. The term includes technical data and computer software. The term does not include information incidental to contract administration, such as financial, administrative, cost or pricing, or management information.

Form, fit, and function data means data relating to items, components, or processes that are sufficient to enable physical and functional interchangeability, and data identifying source, size, configuration, mating and attachment characteristics, functional characteristics, and performance requirements. For computer software it means data identifying source, functional characteristics, and performance requirements but specifically excludes the source code, algorithms, processes, formulas, and flow charts of the software.

Limited rights means the rights of the Government in limited rights data as set forth in the Limited Rights Notice of paragraph (g)(3) if included in this clause.

Limited rights data means data, other than computer software, that embody trade secrets or are commercial or financial and confidential or privileged, to the extent that such data pertain to items, components, or processes developed at private expense, including minor modifications.

Restricted computer software means computer software developed at private expense and that is a trade secret, is commercial or financial and confidential or privileged, or is copyrighted computer software, including minor modifications of the computer software.

Restricted rights, as used in this clause, means the rights of the Government in restricted computer software, as set forth in a Restricted Rights Notice of paragraph (g) if included in this clause, or as otherwise may be provided in a collateral agreement incorporated in and made part of this contract, including minor modifications of such computer software.

Technical data means recorded information (regardless of the form or method of the recording) of a scientific or technical nature (including computer databases and computer software documentation). This term does not include computer software or financial, administrative, cost or pricing, or management data or other information incidental to contract administration. The

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term includes recorded information of a scientific or technical nature that is included in computer databases (See 41 U.S.C. 116).

Unlimited rights means the rights of the Government to use, disclose, reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, in any manner and for any purpose, and to have or permit others to do so.

(b) *Allocation of rights.* (1) Except as provided in paragraph (c) of this clause, the Government shall have unlimited rights in—

- (i) Data first produced in the performance of this contract;
- (ii) Form, fit, and function data delivered under this contract;
- (iii) Data delivered under this contract (except for restricted computer software) that constitute manuals or instructional and training material for installation, operation, or routine maintenance and repair of items, components, or processes delivered or furnished for use under this contract; and
- (iv) All other data delivered under this contract unless provided otherwise for limited rights data or restricted computer software in accordance with paragraph (g) of this clause.

(2) The Contractor shall have the right to—

- (i) Assert copyright in data first produced in the performance of this contract to the extent provided in paragraph (c)(1) of this clause;
- (ii) Use, release to others, reproduce, distribute, or publish any data first produced or specifically used by the Contractor in the performance of this contract, unless provided otherwise in paragraph (d) of this clause;
- (iii) Substantiate the use of, add, or correct limited rights, restricted rights, or copyright notices and to take other appropriate action, in accordance with paragraphs (e) and (f) of this clause; and
- (iv) Protect from unauthorized disclosure and use those data that are limited rights data or restricted computer software to the extent provided in paragraph (g) of this clause.

(c) *Copyright—* (1) *Data first produced in the performance of this contract.* (i) Unless provided otherwise in paragraph (d) of this clause, the Contractor may, without prior approval of the Contracting Officer, assert copyright in scientific and technical articles based on or containing data first produced in the performance of this contract and published in academic, technical, or professional journals, symposia proceedings, or similar works. The prior, express written

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permission of the Contracting Officer is required to assert copyright in all other data first produced in the performance of this contract.

(ii) When authorized to assert copyright to the data, the Contractor shall affix the applicable copyright notices of 17 U.S.C. 401 or 402, and an acknowledgment of Government sponsorship (including contract number).

(iii) For data other than computer software, the Contractor grants to the Government, and others acting on its behalf, a paid-up, nonexclusive, irrevocable, worldwide license in such copyrighted data to reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly by or on behalf of the Government. For computer software, the Contractor grants to the Government, and others acting on its behalf, a paid-up, nonexclusive, irrevocable, worldwide license in such copyrighted computer software to reproduce, prepare derivative works, and perform publicly and display publicly (but not to distribute copies to the public) by or on behalf of the Government.

(iv) The Contractor shall mark each scientific and technical article based on or containing data first produced in the performance of this contract and submitted for publication in academic, technical, or professional journals, symposia proceedings or similar works with a notice, similar in all material respects to the following, on the cover or first page of the article, reflecting the Government's non-exclusive worldwide license in the copyright.

GOVERNMENT RIGHTS NOTICE

This work was authored by employees of SpaceX under Contract No. 80JSC024CA002 with the National Aeronautics and Space Administration. The United States Government retains and the publisher, by accepting the article for publication, acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, worldwide license to reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, or allow others to do so, for United States Government purposes. All other rights are reserved by the copyright owner.

(End of Notice)

(2) *Data not first produced in the performance of this contract.* The Contractor shall not, without the prior written permission of the Contracting Officer, incorporate in data delivered under this contract any data not first produced in the performance of this contract unless the Contractor—

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(i) Identifies the data; and

(ii) Grants to the Government, or acquires on its behalf, a license of the same scope as set forth in paragraph (c)(1) of this clause or, if such data are restricted computer software, the Government shall acquire a copyright license as set forth in paragraph (g)(4) of this clause (if included in this contract) or as otherwise provided in a collateral agreement incorporated in or made part of this contract.

(3) *Removal of copyright notices.* The Government will not remove any authorized copyright notices placed on data pursuant to this paragraph (c), and will include such notices on all reproductions of the data.

(d) *Release, publication, and use of data.* The Contractor shall have the right to use, release to others, reproduce, distribute, or publish any data first produced or specifically used by the Contractor in the performance of this contract, except—

(1) As prohibited by Federal law or regulation (*e.g.*, export control or national security laws or regulations);

(2) As expressly set forth in this contract; or

(3) If the Contractor receives or is given access to data necessary for the performance of this contract that contain restrictive markings, the Contractor shall treat the data in accordance with such markings unless specifically authorized otherwise in writing by the Contracting Officer.

(4)(i) The Contractor agrees not to assert claim to copyright, publish or release to others any computer software first produced in the performance of this contract unless the Contracting Officer authorizes through a contract modification.

(ii) The prohibition on “release to others”, as set forth in (d)(4)(i), does not prohibit release to another Federal Agency for its use or its Contractors’ use, as long as any such release is consistent with any restrictive markings on the software. Any restrictive markings on the software shall take precedence over the aforementioned release. Any release to a Federal Agency shall limit use to the Federal Agency or its Contractors for Government purposes only. Any other release shall require the Contracting Officer’s prior written permission.

(iii) If the Government desires to obtain copyright in computer software first produced in the performance of this contract and permission has not been granted as set forth in paragraph (d)(4)(i) of this clause, the Contracting Officer may direct the Contractor to assert, or authorize the assertion of, a claim to copyright in such data and to assign, or obtain the assignment of, such copyright to the Government or its designated assignee.

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(e) *Unauthorized marking of data.* (1) Notwithstanding any other provisions of this contract concerning inspection or acceptance, if any data delivered under this contract are marked with the notices specified in paragraph (g)(3) or (g) (4) if included in this clause, and use of the notices is not authorized by this clause, or if the data bears any other restrictive or limiting markings not authorized by this contract, the Contracting Officer may at any time either return the data to the Contractor, or cancel or ignore the markings. However, pursuant to 41 U.S.C. 4703, the following procedures shall apply prior to canceling or ignoring the markings.

(i) The Contracting Officer will make written inquiry to the Contractor affording the Contractor 60 days from receipt of the inquiry to provide written justification to substantiate the propriety of the markings;

(ii) If the Contractor fails to respond or fails to provide written justification to substantiate the propriety of the markings within the 60-day period (or a longer time approved in writing by the Contracting Officer for good cause shown), the Government shall have the right to cancel or ignore the markings at any time after said period and the data will no longer be made subject to any disclosure prohibitions.

(iii) If the Contractor provides written justification to substantiate the propriety of the markings within the period set in paragraph (e)(1)(i) of this clause, the Contracting Officer will consider such written justification and determine whether or not the markings are to be cancelled or ignored. If the Contracting Officer determines that the markings are authorized, the Contractor will be so notified in writing. If the Contracting Officer determines, with concurrence of the head of the contracting activity, that the markings are not authorized, the Contracting Officer will furnish the Contractor a written determination, which determination will become the final agency decision regarding the appropriateness of the markings unless the Contractor files suit in a court of competent jurisdiction within 90 days of receipt of the Contracting Officer's decision. The Government will continue to abide by the markings under this paragraph (e)(1)(iii) until final resolution of the matter either by the Contracting Officer's determination becoming final (in which instance the Government will thereafter have the right to cancel or ignore the markings at any time and the data will no longer be made subject to any disclosure prohibitions), or by final disposition of the matter by court decision if suit is filed.

(2) The time limits in the procedures set forth in paragraph (e)(1) of this clause may be modified in accordance with agency regulations implementing the Freedom of Information Act (5 U.S.C. 552) if necessary to respond to a request thereunder.

(3) Except to the extent the Government's action occurs as the result of final disposition of the matter by a court of competent jurisdiction, the Contractor is not precluded by paragraph (e) of the clause from bringing a claim, in accordance with the Disputes clause of this contract, that may arise as the result of the Government removing or ignoring authorized markings on data delivered under this contract.

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(f) *Omitted or incorrect markings.* (1) Data delivered to the Government without any restrictive markings shall be deemed to have been furnished with unlimited rights. The Government is not liable for the disclosure, use, or reproduction of such data.

(2) If the unmarked data has not been disclosed without restriction outside the Government, the Contractor may request, within 6 months (or a longer time approved by the Contracting Officer in writing for good cause shown) after delivery of the data, permission to have authorized notices placed on the data at the Contractor's expense. The Contracting Officer may agree to do so if the Contractor—

(i) Identifies the data to which the omitted notice is to be applied;

(ii) Demonstrates that the omission of the notice was inadvertent;

(iii) Establishes that the proposed notice is authorized; and

(iv) Acknowledges that the Government has no liability for the disclosure, use, or reproduction of any data made prior to the addition of the notice or resulting from the omission of the notice.

(3) If data has been marked with an incorrect notice, the Contracting Officer may—

(i) Permit correction of the notice at the Contractor's expense if the Contractor identifies the data and demonstrates that the correct notice is authorized; or

(ii) Correct any incorrect notices.

(g) *Protection of limited rights data and restricted computer software.* (1) The Contractor may withhold from delivery qualifying limited rights data or restricted computer software that are not data identified in paragraphs (b)(1)(i), (ii), and (iii) of this clause. As a condition to this withholding, the Contractor shall—

(i) Identify the data being withheld; and

(ii) Furnish form, fit, and function data instead.

(2) Limited rights data that are formatted as a computer database for delivery to the Government shall be treated as limited rights data and not restricted computer software.

(3) Notwithstanding paragraph (g)(1) of this clause, the contract may identify and specify the delivery of limited rights data, or the Contracting Officer may require by written request the delivery of limited rights data that has been withheld or would otherwise be entitled to be withheld. If delivery of that data is required, the Contractor shall affix the following "Limited Rights Notice" to the data and the Government will treat the data,

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subject to the provisions of paragraphs (e) and (f) of this clause, in accordance with the notice:

Limited Rights Notice (DEC 2007)

(a) These data are submitted with limited rights under Government Contract No. 80JSC024CA002. These data may be reproduced and used by the Government with the express limitation that they will not, without written permission of the Contractor, be used for purposes of manufacture nor disclosed outside the Government; except that the Government may disclose these data outside the Government to support service contractors and/or pursuant to agreements and contracts related to human exploration such as the ISS, Gateway, or Artemis programs for the following purposes, if any; provided that the Government makes such disclosure subject to prohibition against further use and disclosure:

- (i) Use (except for manufacture) by support service Contractors
 - (ii) Evaluation by nongovernment evaluators.
 - (iii) Use (except for manufacture) by other contractors participating in the Government's program of which the specific contract or agreement is a part.
 - (iv) Emergency repair or overhaul work.
 - (v) Release to a foreign government, contractors, or its instrumentalities, if required to serve the interests of the U.S. Government, for information or evaluation, or for emergency repair or overhaul work by the foreign government
- (b) This notice shall be marked on any reproduction of these data, in whole or in part.

(End of notice)

(g)(4)(i) Notwithstanding paragraph (g)(1) of this clause, the contract may identify and specify the delivery of restricted computer software, or the Contracting Officer may require by written request the delivery of restricted computer software that has been withheld or would otherwise be entitled to be withheld. If delivery of that computer software is required, the Contractor shall affix the following "Restricted Rights Notice" to the computer software and the Government will treat the computer software, subject to paragraphs (e) and (f) of this clause, in accordance with the notice:

Restricted Rights Notice (Dec 2007)

(a) This computer software is submitted with restricted rights under Government Contract No. 80JSC024CA002. It may not be used, reproduced, or disclosed by the Government except as provided in paragraph (b) of this notice or as otherwise expressly stated in the contract.

(b) This computer software may be-

- (1) Used or copied for use with the computer(s) for which it was acquired, including use at any Government installation to which the computer(s) may be transferred;
- (2) Used or copied for use with a backup computer if any computer for which it was acquired is inoperative;
- (3) Reproduced for safekeeping (archives) or backup purposes;

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- (4) Modified, adapted, or combined with other computer software, *provided* that the modified, adapted, or combined portions of the derivative software incorporating any of the delivered, restricted computer software shall be subject to the same restricted rights;
- (5) Disclosed to and reproduced for use by support service Contractors or their subcontractors in accordance with paragraphs (b)(1) through (4) of this notice; and
- (6) Used or copied for use with a replacement computer.
- (c) Notwithstanding the foregoing, if this computer software is copyrighted computer software, it is licensed to the Government with the minimum rights set forth in paragraph (b) of this notice.
- (d) Any other rights or limitations regarding the use, duplication, or disclosure of this computer software are to be expressly stated in, or incorporated in, the contract.
- (e) This notice shall be marked on any reproduction of this computer software, in whole or in part.

(End of notice)

- (ii) Where it is impractical to include the Restricted Rights Notice on restricted computer software, the following short-form notice may be used instead:

RESTRICTED RIGHTS NOTICE SHORT FORM (JUN 1987)

Use, reproduction, or disclosure is subject to restrictions set forth in Contract No. 80JSC024CA002 with SpaceX.

(End of notice)

- (iii) If restricted computer software is delivered with the copyright notice of 17 U.S.C. 401, it will be presumed to be licensed to the Government without disclosure prohibitions, with the minimum rights set forth in paragraph (b) of this clause.

(h) *Subcontracting.* The Contractor shall obtain from its subcontractors all data and rights therein necessary to fulfill the Contractor's obligations to the Government under this contract. If a subcontractor refuses to accept terms affording the Government those rights, the Contractor shall promptly notify the Contracting Officer of the refusal and shall not proceed with the subcontract award without authorization in writing from the Contracting Officer.

- (i) *Relationship to patents or other rights.* Nothing contained in this clause shall imply a license to the Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Government.

(j) The Contractor agrees, except as may be otherwise specified in this contract for specific data deliverables listed as not subject to this paragraph, that the Contracting Officer may, up to three years after acceptance of all deliverables under this contract, inspect at the Contractor's facility any data withheld pursuant to paragraph (g)(1) of this clause, for purposes of verifying the Contractor's assertion of limited rights or restricted rights status of the data or for evaluating work performance. When the Contractor whose data are to be inspected demonstrates to the

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Contracting Officer that there would be a possible conflict of interest if a particular representative made the inspection, the Contracting Officer shall designate an alternate inspector.

(End of clause)

I.17 FAR 52.232-40 PROVIDING ACCELERATED PAYMENTS TO SMALL BUSINESS SUBCONTRACTORS. (MAR 2023)

(a)(1) In accordance with 31 U.S.C. 3903 and 10 U.S.C. 3801, within 15 days after receipt of accelerated payments from the Government, the Contractor shall make accelerated payments to its small business subcontractors under this contract, to the maximum extent practicable and prior to when such payment is otherwise required under the applicable contract or subcontract, after receipt of a proper invoice and all other required documentation from the small business subcontractor.

(2) The Contractor agrees to make such payments to its small business subcontractors without any further consideration from or fees charged to the subcontractor.

(b) The acceleration of payments under this clause does not provide any new rights under the Prompt Payment Act.

(c) Include the substance of this clause, including this paragraph (c), in all subcontracts with small business concerns, including subcontracts with small business concerns for the acquisition of commercial products or commercial services.

(End of clause)

I.18 RESERVED

I.19 FAR 52.252-2 CLAUSES INCORPORATED BY REFERENCE. (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

<http://www.acquisition.gov/far/>

<https://www.hq.nasa.gov/office/procurement/regs/NFS.pdf>

(End of clause)

I.20 FAR 52.252-6 AUTHORIZED DEVIATIONS IN CLAUSES. (NOV 2020)

(a) The use in this solicitation or contract of any Federal Acquisition Regulation (48 CFR Chapter 1) clause with an authorized deviation is indicated by the addition of (DEVIATION) after the date of the clause.

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(b) The use in this solicitation or contract of any NASA FAR Supplement Regulation (48 CFR Chapter 18) clause with an authorized deviation is indicated by the addition of (DEVIATION) after the name of the regulation.

(End of clause)

I.21 NFS 1852.204-75 SECURITY CLASSIFICATION REQUIREMENTS (SEP 1989)

Performance under this contract will involve access to and/or generation of classified information, work in a security area, or both, up to the level of TOPSECRET/SCI. See Federal Acquisition Regulation clause 52.204-2 in this contract and DD Form 254, Contract Security Classification Specification, Attachment J-38, *DD Form 254, Department of Defense Contract Security Classification Specification*.

(End of clause)

I.22 NFS 1852.204-76 SECURITY REQUIREMENTS FOR UNCLASSIFIED INFORMATION TECHNOLOGY RESOURCES (APR 2021) (DEVIATION)

(a) The contractor shall protect the confidentiality, integrity, and availability of NASA Electronic Information and IT resources and protect NASA Electronic Information from unauthorized disclosure.

(b) This clause is applicable to all NASA contractors and sub-contractors that process, manage, access, or store unclassified electronic information, to include Sensitive But Unclassified (SBU) information or Controlled Unclassified Information (CUI), for NASA in support of NASA's missions, programs, projects and/or institutional requirements. Applicable requirements, regulations, policies, and guidelines are identified in the Applicable Documents List (ADL) provided as an attachment to the contract. The documents listed in the ADL can be found at: <http://www.nasa.gov/offices/ocio/itsecurity/index.html> For policy information considered sensitive, the documents will be identified as such in the ADL and made available through the Contracting Officer.

(c) Definitions.

(1) IT resources means any hardware or software or interconnected system or subsystem of equipment, that is used to process, manage, access, or store electronic information.

(2) NASA Electronic Information is any data (as defined in the Rights in Data clause of this contract) or information (including information incidental to contract administration, such as financial, administrative, cost or pricing, or management information) that is processed, managed, accessed, or stored on an IT system(s) in the performance of a NASA contract.

(3) *IT Security Management Plan*. This plan shall describe the processes and procedures that will be followed to ensure appropriate security of IT resources that are developed, processed, or used under this contract. Unlike the IT security plan, which addresses the IT system, the IT Security Management Plan addresses how the contractor will manage personnel and processes associated with IT Security on the instant contract.

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(4) *IT Security Plan*. This is a FISMA requirement; see the ADL for applicable requirements. The IT Security Plan is specific to the IT System and not the contract. Within 30 days after award, the contractor shall develop and deliver an IT Security Management Plan to the Contracting Officer; the approval authority will be included in the ADL. All contractor personnel requiring physical or logical access to NASA IT resources must complete NASA's annual IT Security Awareness training. Refer to the IT Training policy located in the IT Security Web site at <https://itsecurity.nasa.gov/policies/index.html>.

(d) The contractor shall afford Government access to the Contractor's and subcontractors' facilities, installations, operations, documentation, databases, and personnel used in performance of the contract. Access shall be provided to the extent required to carry out a program of IT inspection (to include vulnerability testing), investigation and audit to safeguard against threats and hazards to the integrity, availability, and confidentiality of NASA Electronic Information or to the function of IT systems operated on behalf of NASA, and to preserve evidence of computer crime.

(e) At the completion of the contract, the contractor shall return all NASA information and IT resources provided to the contractor during the performance of the contract in accordance with retention documentation available in the ADL. The contractor shall provide a listing of all NASA Electronic information and IT resources generated in performance of the contract. At that time, the contractor shall request disposition instructions from the Contracting Officer. The Contracting Officer will provide disposition instructions within 30 calendar days of the contractor's request. Parts of the clause and referenced ADL may be waived by the contracting officer, if the contractor's ongoing IT security program meets or exceeds the requirements of NASA Procedural Requirements (NPR) 2810.1 in effect at time of award. The current version of NPR 2810.1 is referenced in the ADL. The contractor shall submit a written waiver request to the Contracting Officer within 30 days of award. The waiver request will be reviewed by the Center IT Security Manager. If approved, the Contractor Officer will notify the contractor, by contract modification, which parts of the clause or provisions of the ADL are waived.

(f) The contractor shall insert this clause, including this paragraph in all subcontracts that process, manage, access or store NASA Electronic Information in support of the mission of the Agency.

(End of clause)

I.23 NFS 1852.216-80 TASK ORDERING PROCEDURE. (OCT 1996) ALTERNATE II (APR 2018) (Applies to FFP IDIQ only)

(a) Only the Contracting Officer may issue task orders to the Contractor, providing specific authorization or direction to perform work within the scope of the contract and as specified in the schedule. The Contractor may incur costs under this contract in performance of task orders and task order modifications issued in accordance with this clause. No other costs are authorized unless otherwise specified in the contract or expressly authorized by the Contracting Officer.

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(b) Prior to issuing a task order, the Contracting Officer shall provide the Contractor with the following date:

- (1) A functional description of the work identifying the objectives or results desired from the contemplated task order.
- (2) Proposed performance standards to be used as criteria for determining whether the work requirements have been met.
- (3) A request for a task plan from the Contractor to include the technical approach, period of performance, appropriate cost information, and any other information required to determine the reasonableness of the Contractor's proposal.

(c) Within 30 calendar days after receipt of the Contracting Officer's request, the Contractor shall submit a task plan conforming to the request.

(d) After review and any necessary discussions, the Contracting Officer may issue a task order to the Contractor containing, as a minimum, the following:

- (1) Date of the order.
- (2) Contract number and order number.
- (3) Functional description of the work identifying the objectives or results desired from the task order, including special instructions or other information necessary for performance of the task.
- (4) Performance standards, and where appropriate, quality assurance standards.
- (5) Maximum dollar amount authorized (cost and fee or price). This includes allocation of award fee among award fee periods, if applicable.
- (6) Any other resources (travel, materials, equipment, facilities, etc.) authorized.
- (7) Delivery/performance schedule including start and end dates.
- (8) If contract funding is by individual task order, accounting and appropriation data.

(e) The Contractor shall provide acknowledgement of receipt to the Contracting Officer within 3 calendar days after receipt of the task order.

(f) If time constraints do not permit issuance of a fully defined task order in accordance with the procedures described in paragraphs (a) through (d), a task order which includes a ceiling price may be issued.

(g) The Contracting officer may amend tasks in the same manner in which they are issued.

(h) In the event of a conflict between the requirements of the task order and the Contractor's approved task plan, the task order shall prevail.

(i) Contractor shall submit progress reports, as required. When required, the reports shall contain, at a minimum, the following information:

- (1) Contract number, task order number, and date of the order.
- (2) Price and billed amounts to date for each task order.
- (3) Significant issues/problems associated with the task order.
- (4) Status of all task orders issued under the contract.
- (5) Invoice number.

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(End of clause)

I.24 NFS 1852.225-8 DUTY-FREE ENTRY OF SPACE ARTICLES (FEB 2000).

The following supplies will be given duty-free entry:

None

(End of clause)

I.25 NFS 1852.225-71 RESTRICTION ON FUNDING ACTIVITY WITH CHINA (FEB 2012) (DEVIATION)

(a) Definition - "China" or "Chinese-owned company" means the People's Republic of China, any company owned by the People's Republic of China, or any company incorporated under the laws of the People's Republic of China.

(b) Public Laws 112-10, Section 1340(a) and 112-55, Section 539, restrict NASA from contracting to participate, collaborate, coordinate bilaterally in any way with China or a Chinese-owned company using funds appropriated on or after April 25, 2011. Contracts for commercial and non developmental items are exempted from the prohibition because they constitute purchase of goods or services that would not involve participation, collaboration, or coordination between the parties.

(c) This contract may use restricted funding that was appropriated on or after April 25, 2011. The contractor shall not contract with China or Chinese-owned companies for any effort related to this contract except for acquisition of commercial and non-developmental items. If the contractor anticipates making an award to China or Chinese-owned companies, the contractor must contact the contracting officer to determine if funding on this contract can be used for that purpose.

(d) Subcontracts - The contractor shall include the substance of this clause in all subcontracts made hereunder.

(End of clause)

I.26 RESERVED

I.27 NFS 1852.239-74 INFORMATION TECHNOLOGY SYSTEM SUPPLY CHAIN RISK ASSESSMENT (JAN 2020) (DEVIATION)

(a) Definitions, as used in this clause.

“Acquire” means to procure with appropriated funds by and for the use of NASA through purchase or lease.

“Covered foreign country” means the People’s Republic of China.

“Covered telecommunications equipment or services” means

- Telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities);

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- For the purpose of public safety, security of Government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities);
- Telecommunications or video surveillance services provided by such entities or using such equipment; or
- Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

“Information Technology (IT) System” is defined as any equipment or system that is used in the acquisition, storage, retrieval, manipulation and/or transmission of data or information. This includes computers, ancillary and peripheral equipment, software and firmware.

(b) The NASA Headquarters (HQ) Office of the Chief Information Officer (OCIO), Office of Cyber Security Services (OCSS)] will review the contractor’s supply chain for the risk of cyber-espionage or sabotage before acquiring any high impact or moderate- impact IT systems or covered telecommunications equipment or services. The OCIO will use the security categorization in the National Institute of Standards and Technology’s (NIST) Federal Information Processing Standard Publication 199, “Standards for Security Categorization of Federal Information and Information Systems” to determine whether an IT system is high-impact or moderate-impact. The NASA HQ OCIO OCSS will use the definition of covered telecommunications equipment or services to determine if a telecommunications or video surveillance equipment or service meets that definition.

(c) The Contractor shall provide the following information for any IT system, or component thereof, or covered telecommunications equipment or services to be provided in performance of the contract

- (1) A brief description of the item(s).
- (2) The vendor/manufacturer’s company name and address.
- (3) If known, the vendor/manufacturer’s web site, and the Commercial and Government Entity (CAGE) code.

(d) The Contracting Officer (CO) will provide the information referenced in paragraph (c) of this section, in addition to the reporting requirements submitted by the contractor in accordance with paragraph (d) of the clause at 52.204-25, Prohibition on Contracting for Certain Telecommunications and Video Surveillance Services or Equipment (if applicable), to the NASA HQ OCIO OCSS, who will assess the risk of cyber-espionage or sabotage and make a determination if the acquisition of the proposed system is in the national interest. NASA shall reject any IT system, or component thereof, or covered telecommunications equipment or service the NASA HQ OCIO OCSS deems to be high impact or moderate impact or covered telecommunications equipment or services unless the HQ OCIO OCSS determines the

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acquisition is in the national interest of the United States. NASA reserves the right to make this decision, without providing any detailed explanation to the Contractor. The CO will advise the Contractor when any IT system, or components thereof, or covered telecommunications equipment or service to be provided in performance of the contract represents an unacceptable risk to national security and may provide the Contractor with an opportunity to submit an alternative solution.

(e) The Contractor shall insert the substance of this clause, including this paragraph (e), in all subcontracts involving the development or delivery of any IT system, or components thereof, or covered telecommunications equipment or service.

(End of clause)

[END OF SECTION]

PART II – CONTRACT CLAUSES**SECTION J - LIST OF ATTACHMENTS**

Attachment	Title
J-01	Data Requirements Description (DRD)
J-02	Reserved
J-03	Acronyms and Abbreviations
J-04	Definitions
J-05	Applicable and Reference Documents List
J-06	Program Management Plan
J-07	Project Life-Cycle Review Plan
J-08	USDV System Architecture and Concept of Operations
J-09	Insight Management Plan
J-10	Organization Conflicts of Interest (OCI) Plan
J-11	Small Business Subcontracting Plan
J-12	Diversity, Equity, Inclusion, and Accessibility (DEIA) Plan
J-13	Configuration Management Plan
J-14	Information Technology Security Management Plan (ITSMP)
J-15	Export Control Plan
J-16	Government Property Management Plan
J-17	Safety and Health Plan
J-18	Risk Management Plan (RMP)
J-19	Safety & Mission Assurance (S&MA) Plan
J-20	Mishap Preparedness and Contingency Plan
J-21	TRL Assessment and Technology Maturation Plan
J-22	Software Management Plan
J-23	Design, Development, Test, and Evaluation (DDT&E) Plan
J-24	Verification and Validation (V&V) Plan
J-25	System Engineering Management Plan (SEMP)
J-26	Assembly, Integration, and Test (AI&T) Plan
J-27	NASA Standards and Specifications Compliance and Tailoring Approach
J-28	Qualification and Acceptance Plan
J-29	Integrated Master Schedule
J-30	Work Plans
J-31	Government Task Agreements
J-32	Standard Labor Categories
J-33	Government-Furnished Property, Facilities, and Data/Information
J-34	Installation Accountable Government Property
J-35	RESERVED
J-36	Authorized Limited Rights in Data and Restricted Computer Software
J-37	RESERVED
J-38	DD Form 254, Department of Defense Contract Security Classification Specification
J-39	Propulsion System Development Approach
J-40	Deliverable Items List (DIL)

Attachment J-01

DATA REQUIREMENTS DESCRIPTION (DRD)

National Aeronautics and Space Administration
Johnson Space Center

DOCUMENT CHANGE LOG

DRD No.	DRD Title	Revision	Date

INTRODUCTION

This document defines the requirements for contractual data to be delivered by the contractor to the Government. The data requirements are set forth in each Data Requirements Description (DRD) and shall govern that data required by the contract. The contractor shall furnish data defined by the DRDs as listed on the Contract Data Requirements List (CDRL) by category of data, attached hereto, and made a part of this contract. Such data shall be prepared, maintained, and delivered to NASA in accordance with the requirements set forth within this document. In cases where data requirements are covered by a Federal Acquisition Regulation (FAR) or NASA FAR Supplement (NFS) clause or other term (e.g., requirements statement), that clause or term shall take precedence over the DRD.

Subject to contract Clause I.16 FAR 52.227-14 RIGHTS IN DATA—GENERAL (MAY 2014) ALTERNATE II (DEC 2007) [(MODIFIED BY NFS 1852.227-14 (APR 2015)) ALTERNATE III (DEC 2007) ALTERNATE V (DEC 2007)], this document sets forth the data requirements in each DRD and shall govern the data required under this contract. The Contractor shall furnish data defined by the DRDs listed by category of data. Such data shall be prepared, maintained, and delivered to National Aeronautics and Space Administration (NASA) in accordance with the requirements set forth herein. In cases where data requirements are covered by a FAR or NFS regulation or clause, the regulation takes precedence, pursuant to FAR 52.215.33.

NASA-Owned/Contractor Held records shall be managed by the Contractor in accordance with Title 36 of the Code of Federal Regulations, Chapter XIII B. Records Management and NPD 1440.6, *NASA Records Management*. The records shall be organized in accordance with the instructions in NPR.1441.1, *NASA Records Management Program Requirements* as applicable. The Contractor shall disposition records and non-records in accordance with NPR 1441.1, which has been approved by NASA. All questions on records management issues shall be directed through the Contracting Officer to the International Space Station (ISS) Records Liaison Officer (RLO) or applicable Program Office RLO.

CDRL: Throughout the performance of the contract, the CDRL provides a listing by number, data type, title, and Office of Primary Responsibility (OPR).

DRD: Each DRD included in this CDRL prescribes content, format, and submittal requirements. The DRDs included in this CDRL are ordered sequentially as listed in the CDRL page(s) that precede(s) the actual DRDs.

Data Type Description: The data types are used to identify the approval and control required for each DRD. The following types are applicable:

Type 1 – Requires NASA approval prior to release. Approved Type 1 documentation shall be controlled, and deviations from or changes to concepts, techniques, and/or requirements stated therein shall require NASA approval prior to implementation. All work under this contract covered by approved Type 1 documents shall be performed in accordance with those approved documents. The Contracting Officer Representative (COR) shall have

approval authority and shall sign the documentation prior to its release. To be an acceptable delivery, disapproved data shall be revised to remove causes for the disapproval prior to its release and implementation. Contractually binding documents shall not be implemented or revised without contractual authorization.

Type 2 - NASA reserves a time-limited right to disapprove in writing any issues and interim changes to those issues. Data shall be submitted to the procuring activity for review not less than 45 calendar days prior to its release for use or implementation. The Contractor shall clearly identify the release target date in the “submitted for review” transmittal. If the Contractor has not been notified of any disapproval prior to the release target date, the data shall be considered approved. To be an acceptable delivery, disapproved data shall be revised to remove causes for the disapproval prior to its release and implementation.

Type 3 – Information and documentation, which is provided to NASA for surveillance, information, review, and/or management control. This information does not require formal NASA review and approval. Information in this category would include status, cost reporting, analyses and test results, and other designated lists, reports, etc.

The contractor shall deliver a complete revised Type 1 or Type 2 data requirement with NASA comments incorporated within 45 calendar days of receipt of comments.

NOTE: Documents submitted per DRDs, even though directly (Type 1) or implicitly (Type 2) approved by NASA, shall not take precedence over the specifications as set out in the Statement of Work (SOW), Section C.

DATA FIDELITY

In addition to the required frequency for data deliverable submittals, the DRD also defines the level of readiness/fidelity, which applies to the submission of DRDs:

Initial (I) - A preliminary version of a delivery for NASA review. Initial submittals may contain some To Be Determined (TBD) items. Initial version fidelity shall reflect the Contractor’s internally approved baseline of the product and be adequate to permit NASA disposition in accordance with the DRD Type. Initial versions may be submitted periodically leading to a Final version.

Final (F) - A Final version of a delivery shall reflect the Contractor’s internally approved final version of the product and is ready for NASA disposition in accordance with the DRD Type. No TBDs may be included. Unless otherwise specified within the DRD, after final version DRD has been dispositioned by NASA, the Contractor shall submit any changes or additions for NASA review and disposition in accordance with the DRD Type.

STATEMENT OF GENERAL REQUIREMENTS

Subcontractor Data Requirement

The prime contractor is responsible for flowing down any specific data requirements that apply to subcontracts and vendor agreements.

Reference to subcontractor data in the contractor's responses is permissible and a copy of the referenced subcontractor data must be supplied with the response document at time of delivery to NASA.

Data Distribution, Format, and Transmittal

Data Distribution:

The Contractor shall provide one copy of each DR to the standard distribution list shown in Item 10 of the DRDs. Additional distribution shall be made as directed, in writing, by the Contracting Officer. EDMS Delivery Notices will be used to confirm delivery of electronically resident DR Deliverables.

Data Format

The Contractor's submittal in response to the DRDs shall be provided in an electronic format that meets four basic requirements: "Readable", "Printable", "Searchable", and "Downloadable" by NASA utilizing publicly available off-the-shelf software. If the electronic format is not supported by publicly available off-the-shelf software, the Contractor shall provide NASA with the necessary software and approach to support the four basic requirements.

Data deliverables shall be delivered to NASA in the format specified below unless a specific format is required by a DRD. Data submittals shall consist of native format electronic file(s). NASA's preferred native formats include Microsoft Word, Excel, or PowerPoint, as appropriate.

Data Transmittal

Data shall be transmitted to NASA by submittal into an International Space Station (ISS) Program Authorized Repository (e.g. Electronic Document Management System (EDMS) for most DRD deliverable submittals or the Vehicle Master Data Base specifically for drawings). The Contractor shall attach an EDMS Delivery Notice (DN) to each deliverable to notify the Contracting Officer and the Contracting Officer Representative (COR) electronically of DR Delivery.

DRs listed as requiring updates: The Contractor shall review the document to ensure that all content in the deliverable is verified as current and accurate. If the Contractor's review determines that all content in the deliverable is verified as current and accurate, the Contractor shall submit a transmittal memorandum with a Delivery Notice to the Program Authorized Repository (EDMS or equivalent) stating that the document has been reviewed for currency and accuracy and requires no revision at this time (referencing the most current version and date– Basic, Rev 1, with date). If the Contractor's review determines that any content in the deliverable is not current and accurate, the Contractor shall resubmit

the deliverable with appropriate updates to ensure it is current and accurate.

Data Transmittal Package:

For each DRD, the transmittal package shall:

- a) Provide the following information in a Contractor transmittal memorandum:
1. Contract number
 2. Task or Delivery Order number (if applicable)
 3. DRD number
 4. DRD data type
 5. Submission date
 6. Milestone being satisfied (if applicable)
 7. Document number, date and revision
 8. Document title
 9. File names of all files being delivered; file naming convention shall clearly identify the document being delivered; multiple files per document must be clearly related to the document
 10. NASA Records Retention Schedule (NRRS) number, if applicable (See NRRS 1441.1, *NASA Records Retention Schedules*)
 11. Distribution (Notification list as defined by the DRD distribution field)
 12. Targeted release date

EDMS Workflow Process

The contractor shall deliver a Data Requirement (DR) to NASA electronically using the EDMS workflow. Approval of DRs is based on the prescribed data type, described above. A DR will follow a workflow process once it is delivered into EDMS where it may either be approved or marked for “rework”. If NASA approves a DR, the contractor will get notification via e-mail that the DR has been approved. If the DR is rejected, NASA will provide comments to the contractor through the “rework” process detailing why it has not been approved. The contractor has 45 calendar days from the date the DR was rejected to disposition NASA comments and resubmit the DR electronically into EDMS. The DR will then be either approved or sent back again to the contractor via the “rework” process. There is not a limit on how many times a DR can go through the “rework” process before it is finally approved.

SOW Data Deliveries

Data required in accordance with a SOW statement that does not have a DR reference will be delivered to NASA electronically using the EDMS workflow, indicating the applicable SOW paragraph. This information does not require NASA’s approval prior to its release in EDMS and will be released in EDMS upon delivery.

Document Identification: For all data types, the document number, change legend, date, and title constitute the minimum identification of the specific document and shall appear on the cover and title page. The contract number shall also appear on the cover and title page as separate markings. The originator and organization shall be included on the title page. The document number, change legend and date shall appear on each page of the document. All Type 1 documentation shall be marked “PRELIMINARY PENDING

NASA APPROVAL,” and once approved shall be reissued with “APPROVED BY NASA” and the date and approval authority annotated on the cover.

Data Restriction Determination and Marking Requirements: The contractor shall properly mark data in accordance with the data rights clause(s) included in the contract. The contractor shall mark data deliverable sections with appropriate data restrictions and export classifications. The contractor shall not apply the most restrictive classification to the entire data delivery if only applicable to one section. If NASA does not agree with the contractor applied data restriction, the CO shall request supporting rationale for applied data restrictions. If NASA does not agree with the rationale, the CO shall return the data to the contractor, cancel the markings, or ignore the markings consistent with the procedures set forth in the "data rights" clause(s) contained in the contract and per U.S. export laws.

The contractor shall ensure all Controlled but Unclassified Information (CUI) is marked in accordance with NASA Procedural Requirements (NPR) 2810.7, *Controlled Unclassified Information* and ITS-HBK-CUI, *Controlled Unclassified Information Handbook*.

If data delivered under this contract is subject to the International Traffic in Arms Regulations (ITAR), the data shall contain an “ITAR Notice” as follows:

International Traffic in Arms Regulations (ITAR) Notice

This document contains information which falls under the purview of the United States (U.S.) Munitions List (USML), as defined in the International Traffic in Arms Regulations (ITAR), 22 CFR 120-130, and is export controlled. It shall not be transferred to foreign nationals, in the U.S. or abroad, without specific approval of a knowledgeable NASA export control official, and/or unless an export license/license exemption is obtained/available from the United States Department of State. Violations of these regulations are punishable by fine, imprisonment, or both.

Insert Destination Control Statement that includes export classification and corresponding export authority.

If data delivered under this contract is subject to the Export Administration Regulations (EAR), the data shall contain the “EAR Notice” as follows:

Export Administration Regulations (EAR) Notice

This document contains information within the purview of the Export Administration Regulations (EAR), 15 CFR 730-774, and is export controlled. It may not be transferred to foreign nationals in the U.S. or abroad without specific approval of a knowledgeable NASA export control official, and/or unless an export license/license exception is obtained/available from the Bureau of Industry and Security, United States Department of Commerce. Violations of these regulations are punishable by fine, imprisonment, or both.

Insert Destination Control Statement that includes export classification and corresponding export authority.

Reference to Other Documents and Data Deliverables in Data Submittals: The Contractor's submittal of a DRD deliverable may refer to other documents and/or other DRD deliverables. At the time of submission of the DRD deliverable, any referenced document within the DRD deliverable shall be made available to NASA. The Contractor shall provide NASA with access to any referenced document and the location of that data within the referenced document. Any reference made to data associated with another DRD deliverable that is required separately by the contract, shall include the DRD number of and location of the data within the referenced DRD deliverable.

Document Revisions:

The Contractor shall employ a system for organizing, identifying, and tracking all submittals of DRD deliverables, to include any changes, revisions, dates, NASA approvals, disapprovals and requested updates.

Revisions of documentation previously submitted may be accomplished either by individual page revision or by a complete reissue of the document.

A document shall be completely reissued when, in the opinion of the contractor and/or NASA, the document has been revised to the extent that it is unusable in its present state, or when directed by the CO. When complete reissues are made, the entire contents of the document shall be brought up to date and shall incorporate revised pages. All revisions shall be recorded. A revision log shall identify complete reissues except for periodic reports and documents, which are complete within themselves as final.

Individual page revisions shall be made as deemed necessary by the contractor or as directed by the CO.

Changes of a minor nature to correct obvious typing errors, misspelled words, etc., shall only be made when a substantial change is made, unless the accuracy of the document is affected.

All revised pages shall be identified by a revision identifier and a new date. Each document shall contain a log of revised pages that identify the revision status of each page with the revision symbol. This list shall follow the table of contents in each document. The line or lines revised on a given page shall be designated using vertical line in the margin of the page, and the change authority shall be indicated adjacent to the change.

CDRL/DRD MAINTENANCE PROCEDURES

NASA-Initiated Change: New and/or revised data requirements shall be incorporated by contract modification to which the new or revised portion shall be appended. The contractor shall notify the CO in the event a deliverable data requirement is imposed and is not covered by a DRD, or when a DRD is changed by a contract modification and for which no revision is appended.

CDRL or DRD Change Procedures

Revisions to the CDRL or DRDs will be identified by NASA in the Document Change

Log. The date of the revision, DRD number, title, and revision description will be annotated in the Document Change Log. Revision descriptions will include the modification number, which implements the change, and a brief description of the portions of the CDRL and/or DRD affected within the "Revision" column of the Document Change Log.

DRDs Submitted As Part of Project Life Cycle Review Data Packages

Multiple DRDs are required to be delivered as part of Project Life Cycle Review Data Packages. All DRDs which have a submission tied to a Project Life Cycle Review (e.g. Critical Design Review (CDR), System Acceptance Review (SAR), Dwell Release Review (DRR) etc.) are due as part of the review data package thirty (30) calendar days prior to the life-cycle review per Project Life-Cycle Review Plan and Data Packages (DRD USDV-3). Following the review, these DRDs shall be submitted for NASA approval using an EDMS Delivery Notice with the required updates as agreed upon at the review no later than seven (7) calendar days after successful completion of the life cycle review.

CDRL Submission Table

The following includes a CDRL Submission Table for convenience. If any discrepancies exist between the information in the CDRL Submission Table and the DRD documentation, the information contained within the DRD takes precedence.

1. DRD Title: Program Management Plan (PMP)		
2. DRD No.: USDV-1	3. Data Type 1	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: Describes the Contractor's organization philosophy for managing contractual, program, technical, operations, and interfaces with respect to their internal business unit, subcontractors, and associate contractors. Allows for re-calibration of the NASA – Contractor interface points during the period of performance.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR ON/USDV Lead OH/Assessment Office Initial Submission: Initial: PMP paragraphs a through p, provide with proposal Additional Submissions: Full PMP update due at 30 working days post contract award, Final due at Mission Concept Review (MCR) Submission Frequency: The plan shall be reviewed annually for currency and submitted by Sept. 30 th if updates are required to reflect changes to the plan. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this. Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment. Interrelationship: SOW: 2.1 <i>Program Management</i> , 2.2.2 <i>Resource Management</i> , 3.6 <i>Mission Concept Review (MCR)</i> ; DRD: USDV-2, USDV-3, USDV-19, USDV-20, USDV-27, Clause I.26, <i>NFS 1852.234-2 Earned Value Management System</i> Applicable Documents: SSP 50175, <i>ISS Risk Management Plan</i> , <i>EIA-748</i> , <i>AS9100</i> Scope: The PMP describes the Contractor's overall plan for managing the contracted scope of work. Contents:		

The plan shall describe the Contractor's approach to managing the contract scope, including management approach, performance management implementation, teaming arrangements, communication processes, strategies, policies, processes for work planning, work prioritization, subcontractor management, supply chain management, indirects management, Associate Contractor Agreements, facilities, operating locations, use of Government provided services, and any efficiencies planned. The plan shall include the following descriptions (not limited to):

- a. Identify all available corporate resources that will be used on this contract, including personnel, facilities, and equipment, which are either internal or external to this contract, and methods and risks associated with obtaining these resources. Identify management, technical, and business approaches, strategies, policies, and processes used to assign, monitor, measure, control, and accomplish contractual tasks and performance and integrate cost, schedule, and technical performance across all areas of the contract. Describe processes and procedures used to manage workload definitization, assignment, prioritization, surges, and use of shared personnel and facility resources. Describe management and controls of hybrid contract (*if proposed in USDV Contract Clause B.3*) to ensure no transfer of costs from firm-fixed price to cost-reimbursable CLINs.
- b. Provide a contract-specific organization chart, including subcontractors, and teaming partner(s), as applicable, and a rationale for the approach selected. Define the direct lines of control, responsibilities, functional relationships, and authority between the USDV program management and the Contractor's other organizational elements, corporate management, and subcontractors/teaming partners. If there is a subcontracting or teaming arrangement, include specific details on how the subcontractor or teaming partner is managed, how their performance is incentivized, the business size of each company, the relative amount of work to be performed by each, and if there are discreet tasks to be performed by each or whether there is co-mingling of personnel and resources.
- c. Describe the approach to delivering all technical data, computer software, and computer software documentation developed and delivered under this contract or otherwise incorporated within a system provided under this contract. Further, describe the Contractor's approach to incorporating any data not first produced in the performance of this contract into data delivered under this contract and how this process conforms to the requirements in Clause I.16 FAR 52.227-14, RIGHTS IN DATA—GENERAL (MAY 2014) ALTERNATE II (DEC 2007) [(MODIFIED BY NFS 1852.227-14 (APR 2015)] ALTERNATE III (DEC 2007) ALTERNATE V (DEC 2007), and Clause H.17 IDENTIFICATION AND REPRESENTATION OF LIMITED RIGHTS DATA AND RESTRICTED COMPUTER SOFTWARE AFTER AWARD.
- d. Describe Contractor's approach to vetting subcontractor assertions of limited rights data and ensuring all data delivered to the Government is delivered with appropriate contractual markings.
- e. Describe plans for staffing location, including lease arrangements, for the Contractor's off-site facilities including a discussion of the government on-site and off-site

- approach (if needed). Discuss logistics management plans consistent with Contractor's management approach to deliver the full scope of the USDV contract for events occurring at Contractor off-site, at government on-site facilities, including transfer of flight hardware to the next level integrator.
- f. Describe all USDV contractor interfaces between the Contractor and the Government; describe the Contractor's plan to create an efficient and effective interface to the Government for the management, performance, communication, program schedules, deliveries, integration, testing, operations, and information technology required to complete the contract requirements. Describe the approach and process for conducting reviews with NASA management, such as Program Reviews, technical reviews, Project Life-Cycle Reviews, contract reviews, Technical Interchange Meetings (TIMs) with NASA, NASA panels and control boards, and working groups.
 - g. Describe the Contractor's approach to key personnel. For each key personnel position identified, include qualification requirements for that position, selection process for that position, roles, and responsibilities of that position, interfaces the position has with the Government, and transition process of personnel in that position during contract execution in accordance with Clause H.6, NFS 1852.235-71 KEY PERSONNEL AND FACILITIES (MAR 1989).
 - h. Describe the approach to Contractor's decision-making process and authority (e.g., working groups, panels, and control boards), and interfaces with NASA control boards for approval of system baseline, and baseline changes that could impact the USDV, ISS, or crew. Describe Contractor's approach to making decisions about the management, operation, and design of the USDV System that impact lifecycle costs, while still ensuring NASA requirements are met. Describe the Contractor's approach to handling dissenting opinions (operational and non-operational). Describe the Contractor's governance structure.
 - i. Describe the Contractor's approach, process, and timeline for work authorization, and assignment from identification of new work through Authority to Proceed (ATP) to subcontractors, to include but not limited to evaluation of NASA Change Requests, generation of Basis of Estimate Rough Order of Magnitudes, tailoring requirements; requests for Government furnished resources; assertions of data rights, delivery of quality and timely proposals in response to Request for Task/Delivery Order Proposals and core contract Change Requests.
 - j. Describe the approach for how the Contractor manages and reports risk. Specify the program/project risk objectives and policy toward risk. Provide an overview of the risk management process and information flow; describe how the risk management process integrates and relates to other project management and system engineering activities including but not limited to lessons learned reporting, System Safety analyses, reliability analyses, NASA probabilistic risk assessment (PRA), schedule, financial, and other business reporting systems. Include general risk mitigation strategies to be employed throughout the project life cycle. The Contractor's approach shall be consistent with SSP 50175, *ISS Risk Management Plan* and the details provided in *Risk Management Plan (DRD USDV-19)* post award.
 - k. Describe the Contractor's approach and rationale to implementing a performance

management system including specific performance objectives, measurements, standards, and tools used to manage, report, improve, and adapt performance against the project baseline across the full scope of work on contract. Describe the Contractor's approach to integrating across the prime contractor and its subcontractors the contracted scope, project management baseline, scheduling, budgeting, work authorization, establishment of objective performance measurements, cost accumulation (*applies to CPIF only*), performance assessments, management of costs to the contracted target cost value (*applies to CPIF only*), implementation of managerial actions taken as a result of earned value information (*applies to CPIF only*) and timely incorporation of NASA authorized changes into the schedule and budget baselines

- l. Identify the Contractor's controls applicable to tasks, activities, and projects exceeding established schedule and cost baselines and discuss Contractor's approach and methods to recover, while ensuring the full scope of contracted effort is delivered in accordance with contractual obligations.
- m. Describe the Contractor's Systems Engineering approach, processes and tools used to implement the contracted technical effort and document the overall technical approach, maintain integrity between NASA and Contractor requirements to the Contractor verification plans, and to transition the products through the lifecycle (for both Contractor and subcontractor efforts). The Contractor's approach shall be consistent with the details provided in *System Engineering Management Plan (SEMP) (DRD USDV-27)* post award.
- n. Describe the Contractor's approach to the scalability to support Indefinite Delivery, Indefinite Quantity (IDIQ) task/delivery ordering Contract (CLINs 3-5) and Changes to baseline work (CLINs 1 & 2) including lead times covering the full scope of this work anticipated for this contract. Describe the approach to staffing, maintaining, and augmenting a qualified workforce to meet contract needs in a timely manner through the life of the contract, including dwell and sustaining. Describe the overall management approach for attracting and retaining personnel capable of meeting contract requirements at a high level of excellence. Describe the staffing and skills required for proper accomplishment of the contractual tasks. Describe the strategy to ensure personnel will maintain the minimum qualification standards described in the Standard Labor Categories. For the proposal, state how many personnel are currently available and how many new hires are required to staff fully to accomplish the USDV contract with the Contractor's proposed baseline schedule.
- o. Describe the Contractor's approach and methodology to manufacturing / production spares to ensure USDV production maintains on schedule, the USDV is delivered on-time, and the USDV is sustained through its entire lifecycle.
- p. Describe the Contractor's approach and methodology to obsolescence and life extension management in the case of an extended Dwell to ensure a reliable USDV is delivered and sustained in accordance with *Safety and Mission Assurance (S&MA) Plan (DRD USDV-20)* and USDV sustaining support remains available to meet - NASA requirements throughout the life of the contract.
- q. Describe the Contractor's approach to identifying, resolving, and prioritizing conflicts

between USDV contract performance and Contractor's work in support of other Government and commercial customers.

- r. Describe the management approach to obtaining and maintaining all required local, state, federal, licenses, permits, and agreements required in the performance of the contract.
- s. Describe how management policies, procedures, and techniques are monitored to ensure their effectiveness and facilitate continuous improvement.
- t. Describe the methods and plans to identify and correct deficiencies. Describe the Contractor's approach to identifying and resolving Corrective Actions and the Government's role when applicable.
- u. Identify performance metrics for contract surveillance by NASA that are consonant with the importance of the products and services delivered, and which provide the ability to evaluate the quality, quantity, and timeliness of the Contractor's performance outputs. These metrics shall include references to SOW paragraphs for the three categories: most important outcome-based metrics, leading indicator metrics, and trend metrics.
- v. Describe the Contractor's approach to implementing Associate Contractor Agreements and identify the specific agreements and purpose, which are required to conduct the USDV contractual obligations.
- w. Provide the data and records data management plan, which describes the Contractor's plan to store, provide access to, and transition at contract end, all deliverable data and records generated during the contract and transitioned to the contract. The plan shall define the scope and depth of the Contractor's efforts including management, organization, planning, and implementation. The plan shall include the following elements: 1) data and records identification, 2) data and records control, 3) data and records status accounting, 4) data and records acquisition, 5) data and records management and verification, 6) data and records management organization, 7) data and records storage and retrieval procedures, 8) subcontractor procedures, 9) special restrictions, 10) process to transition data and records at contract end, and 11) NASA Records Management training for personnel responsible for managing records. The plan shall include the data submittal schedule for fulfilling submission of data in the specific quantities, media, and due dates required.
- x. Describe Contractor's approach to Sensitive Positions in accordance with Clause I.1.II NFS 1852.223-74, *Drug- and alcohol-free workforce* for this contract. Provide the list of contractor and subcontractor positions that the contractor has identified for this contract.
- y. Describe the Contractor's approach to implement and facilitate a proactive and efficient close-out of the contract.

Remarks: It is not intended that this plan duplicate other plans called for in other DRDs. This plan shall summarize the overall project and reference or summarize other plans where appropriate and shall reference Contractor internal procedures where applicable.

The final plan, as approved, shall be incorporated in the contract as Attachment J-06,

Program Management Plan.

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated, and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Program Management Review (PMR)		
2. DRD No.: USDV-2	3. Data Type: 2	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The following contains the data that the Contractor shall provide in support of each quarterly PMR. PMRs provide an opportunity for discussions and technical interchange between NASA and the Contractor regarding progress of USDV contract.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO and CS OA/COR and Alternate COR OH/ISS Data Management ON/USDV Lead OH/Assessment Office LC/ISS Resource Management Office Initial Submission: Initial PMR data package be delivered on the last Thursday of the month following the quarter in review (e.g. for Quarter October – December 2024, data package is due January 30, 2025) and no later than two (2) calendar days prior to the meeting. Additional Submissions: Quarterly. PMR data package shall be delivered on the last Thursday of the month following the quarter in review and no later than two (2) calendar days prior to the meeting. The Contractor shall delivery PMR final charts, minutes, actions, and estimated closure dates within seven (7) calendar days after the meeting. Submission Frequency: PMR data package shall be delivered on the last Thursday of the month following the quarter in review and no later than two (2) calendar days prior to the meeting. The Contractor shall publish PMR final charts, minutes, actions, and estimated closure dates within seven (7) calendar days after the meeting.		

Format: Specific formatting to be tailored by NASA/Contractor.

Interrelationship: SOW: 2.1.1 *Program Management Review (PMR)*, 5.0 *Dwell (CLIN 3)*; DRD: USDV-1, USDV-3, USDV-7, USDV-8, USDV-19, USDV-20, USDV-23, USDV-24, USDV-25, USDV-30, USDV-32

Applicable Documents: N/A

Scope: As a basis for the discussions and technical interchange, the PMR Briefing Package shall detail the Contractor's, subcontractors', vendors' overall technical, schedule, cost (*applies to CPIF only*) performance as well as the Contractor's risk assessment and forward plans.

Contents:

The data and reviews shall cover all aspects of the contract. Specific agendas for reviews with NASA shall be co-managed by NASA and the Contractor. For each data package and review, the contractor shall provide/present the following:

- 1) Current status: provide cost/schedule/technical status with explanations and risk for full scope of contracted effort (*note: cost applies to CPIF only*). Provide previous reporting period and current Cost Performance Index (CPI) and Schedule Performance Index (SPI) (*note: CPI and SPI applies to CPIF only*). Include drivers of any schedule variances, schedule margins, cost variances at complete (*note: cost variance applies to CPIF only*), and technical issues. Include recovery plans and estimate closure dates.
- 2) Current schedule overview
 - a) Program Plan (major events), baseline planned vs actual, and forecast dates for all major events.
 - b) Major upcoming events (next 6 months)
 - c) Current Critical Path
- 3) Summary of *Integrated Program Management Data Analysis Report (IPMDAR)* (**DRD USDV-7**) including:
 - a) For both CPIF and FFP:
 - i) Summary of Schedule and Schedule Performance Data set
 - ii) Summary of Performance Narrative Report (PNR)
 - b) For CPIF only:
 - i) Summary of Contract Performance Data set
 - c) Identification of interdependencies among tasks associated across all CLINs, and associated risks, impacts, and mitigation plans.
- 4) Issues and problems (including at subcontractor/suppliers) affecting schedule, quality, performance, risks, and mitigation plans.

- 5) Closure status of action items from previous PMRs, Project Life Cycle Reviews, and corrective actions, including their status, due date, estimated closure date, closure plan, and closure rationale.
- 6) The status, closure plan and schedule to demonstrate compliance to the contract requirements. This shall include:
 - a) Status of Key Design Parameters, which track the implementation of key requirements.
 - b) Technical performance status related to margins, comparison of actual versus predicted margin for Technical Performance Measures, resolution of the previous review discrepancies addressing effectiveness of technical achievement and communicating the overall risk to the project.
 - c) Summary status of trade studies, including their status, completion or due date, estimated closure date, and closure plan
 - d) A status of the USDV design requirements, verification and validation (V&V) activities, and Verification Closure Notice (VCN) closures with NASA acceptance status.
 - e) A summary of any tasks required to be repeated in the event of changes to the USDV baseline.
- 7) Burn down charts with prior and current period status along with an executable and achievable burn down plan showing:
 - a) Requirement Trends (% growth, number of requirement changes, To Be Determined/To Be Reviewed (TBD/TBR)s burndown)
 - b) Interface Trends (% Interface Control Document (ICD) approved, TBD/TBR burndown, number of interface change requests)
 - c) Engineering drawings scheduled to be released vs released
 - d) Purchase orders required, issued, definitized, closed
 - e) Number of parts needed, ordered, received, accepted
 - f) Software-unique Trends (number of requirements/features per build/release vs. plan)
 - g) Review Trends (Request for Action/Review Item Discrepancy (RID)/Action Item closure)
 - h) Verification Trends (VCN closure burndown, Deviation/Waivers, non-conformances, non-compliance (anticipated/approved/open))
 - i) Problem Report/Discrepancy Report Trends (number open and closed)
 - j) Manufacturing Trends (number of Material Review Board (MRB) nonconformance/corrective actions)

Note: Refer to OCE-52, *NASA Common Leading Indicators Detailed Reference Guide*.

- 8) Change Management

- a) List of all changes dispositioned over the past quarter
- b) List of all changes currently under evaluation
- 9) Test status including a summary of all development, qualification, acceptance, and integrated system testing schedules and results.
- 10) Status of Long Lead Parts
 - a) Procurement – planned vs actual performance, forecast for next quarter. Identify any risk mitigations.
 - b) Receipt and Acceptance – planned vs actual performance, forecast for next two quarters. Identify any risk mitigations.
- 11) Risk management status that includes a description of the top USDV project risks (e.g., Technical, schedule, cost) with a discussion of potential impacts to the USDV System safety, reliability, technical, cost/price and schedule performance, and the Contractor’s mitigation strategies, and any areas for potential Government assistance.
- 12) Contractor’s progress in safety, engineering, manufacturing, fabrication, testing, logistics, configuration management, sustaining, and quality assurance issues, and other areas identified as high risk.
- 13) Safety and Mission Assurance (S&MA):
 - a) S&MA key issues and concerns, including impact, action plan, and projected resolution date
 - b) Detailed content related to S&MA disciplines reliability, inputs to NASA PRA, Electrical, Electronic and Electromechanical (EEE) parts, quality assurance, materials and processes, system safety, and software assurance
 - c) Status of analyses with traceability to subsystem/system
 - d) Summary of activities for that period to include issues/resolutions, analyses results, test results, and nonconformances
 - e) Failures, anomalies, waivers/deviations, audits & findings (including Product Assurance Action (PAA) closures and status), mishaps, and quality metrics
 - f) Summary of upcoming activities for the next period including level of confidence to successfully achieve the next period (including Dwell and Launch)
 - g) Status of corrective actions and open items
- 14) Status of Flight Operations products and support including:
 - a) USDV-to-Ground ICD development
 - b) Status of mission support facilities development, testing and sustaining
 - c) Status of simulators development, testing and sustaining
 - d) Status of input to flight procedures, flight rules, training products, etc.
 - e) Readiness to support joint simulations

- f) Status of contractor's personnel certifications to support USDV real-time operations
- 15) Status on inputs to support ISS integration
- 16) Status on inputs to launch vehicle integration
- 17) Status of development, testing and sustaining of contractor's displays and tools required for contractor to monitor and analyze the USDV procedures and USDV performance during Launch Vehicle Integration and Sustaining phase.
- 18) DRD Submission Status
 - a) Listing of DRD submissions and summary level of the changes in those submissions which were made since last PMR
 - b) Forecast of DRD submissions and summary level of the changes planned for next two quarters.
- 19) Insight and collaboration status highlighting current status of NASA/Contractor interfaces, tools, and processes used for establishing effective, efficient, and transparent insight, and collaboration between Government and Contractor teams at all levels.
- 20) Summary status of the special task and study assignments (under CLIN 5) that were started, in work, or completed since the previous PMR. Forecast of tasks and milestone completion for special task and study assignments (under CLIN 5) to be performed for upcoming quarter.
- 21) Summary status IDIQ Task/Delivery Orders milestones (technical and schedule performance).
- 22) Status of progress on signed contracts and agreements with subcontractors, vendors, suppliers, and partners, and forward plans.
- 23) Special topics/other areas as identified by NASA and Contractor during PMR agenda coordination.
- 24) Readiness to support a Launch-12 month call-up for launch.
- 25) Status of Key Personnel and Facilities from Clause H.6 (current listing of personnel/facilities and any upcoming changes, if known)
- 26) Status of deliveries on the Deliverable Items List (DIL)(Attachment J-40).
 - a) Contractual Due Date
 - b) Forecast Delivery Date: Current quarter and previous quarter
 - c) Actual Delivery Date achieved (upon Government acceptance)
- 27) If in Dwell, the Contractor shall present status and provide the following additional information at the PMR:
 - a) Compliance with activity and operations described in *USDV Spacecraft Readiness Plan (DRD USDV-30)*
 - b) Summary of the overall health and status of the USDV
 - c) Preventative and corrective maintenance performed since previous status review or

initial arrival at dwell facility (as applicable)

- d) Testing and inspection performed since the previous status
- e) Summary of closure of action items, anomalies, and issue resolutions from previous status review
- f) Identification of any new anomalies, issues, or non-conformances since the previous review and resolution or the proposed resolution plan
- g) Status of limited-life items
- h) Summary of preventative maintenance, testing, inspection, or other activity and operations scheduled to be performed prior to the next status review
- i) Status on contractor's inputs to FOD operational products
- j) Status on contractor's inputs to Launch Vehicle Integration products
- k) Status on contractor's inputs to NASA Mission Systems Integration products
- l) Status of operations and sustaining teams' proficiency
- m) Road-to Plan for the Ship-to-Launch Site (if notification of launch date has been received from NASA) including identification of key tasks and key decision points required for USDV readiness to ship to launch site

Color Definitions:

Green: early/on-time schedule delivery; cost underrun or no greater than 5% over budget (*applies to CPIF only*), no technical issues.

Yellow: projected late delivery but potential to recover schedule; cost overrun between 5-10% (*applies to CPIF only*); technical issues being worked, but no Government help needed.

Red: schedule unrecoverable; cost overrun greater than 10% (*applies to CPIF only*); technical issues requiring Government help.

Remarks: The Contractor shall publish PMR charts at least two (2) calendar days prior to the meeting.

Quarterly Review data package shall be delivered on the last Thursday of the month following the end of the quarter.

For the cases where a PMR coincides with a required Project Life-cycle Review prescribed the SOW, the PMR meeting may be combined with the required review.

The PMR data shall be consistent and reconcile with the 533 data (USDV-8)(*applies to CPIF only*) and IPMAR data (USDV-7). Any deviations must be explained.

Maintenance: Electronic changes shall be incorporated as required by change page or complete reissue.

1. DRD Title: Project Life-Cycle Review Plan and Data Packages		
2. DRD No.: USDV-3	3. Data Type: 1	4. OPR: ON
5. Solicitation No.: 80JSC023R0003	6. Contract No.: 80JSC024CA002	
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: To establish an agreement between NASA and the Contractor on planning, preparing for, entrance and exit success criteria, data delivery, and conducting Project Life-cycle Reviews. Describes the Contractor’s methodology, actions, and readiness to satisfy Project Life-Cycle reviews. To establish the data required for Project Life-Cycle Reviews listed in CLIN 1, CLIN 2, and CLIN 3.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor’s CO BG/CO OA/COR and Alternate COR OH/ISS Data Management ON/USDV Lead Initial Submission: <u>Project Life-Cycle Review Plan:</u> Initial (paragraph a only) Provide with Proposal. <u>Joint Integration Plan (JIP):</u> Mission Concept Review (MCR) JIP due at Contract Kickoff. System Acceptance Review (SAR) JIP due at SAR – 6 months. All other JIPs due at least 120 calendar days prior to the review <u>Project Life-Cycle Review presentation(s) and all data pack material:</u> All presentation and data package materials due at least thirty (30) calendar days before the review is held. <u>Project Life-Cycle Review Closeout Package:</u> Due no later than seven (7) days after the review. Submission Frequency: Project Life-Cycle Review Plan: Final due at MCR. Update required for currency if the content changes Project Life-Cycle Review Presentation and Data packages: Submitted to Program		

Authorized Repository (EDMS or equivalent) are due 30 calendar days prior to each scheduled review.

Project Life-Cycle Review Closeout Package: Due no later than seven (7) days after the review.

Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment.

Interrelationship: SOW: 2.7 *Project Life-Cycle Reviews*, 3.6 *Mission Concept Review (MCR)*, 3.7 *System Requirements Review (SRR)*, 3.8 *System Definition Review (SDR)*, 3.9 *Preliminary Design Review (PDR)*, 3.10 *Critical Design Review (CDR)*, 4.2.4 *System Integration Review (SIR)*, 4.3.3 *Assembly, Integration, and Test Progress Review (APR)*, 4.4.5 *System Acceptance Review (SAR)*, 4.5.1 *Shipment to Acceptance Destination*, 5.1 *Dwell Release Review (DRR)*; DRD: USDV-1, USDV-2, USDV-4, USDV-5, USDV-10, USDV-13, USDV-19, USDV-20, USDV-21, USDV-22, USDV-23, USDV-24, USDV-25, USDV-26, USDV-27, USDV-28, USDV-29, USDV-30, USDV-31, USDV-32, USDV-33, USDV-34, USDV-35, USDV-36, USDV-37, USDV-38, USDV-39, USDV-40, USDV-41, USDV-42, USDV-44, USDV-46, USDV-47

Applicable Documents: N/A

Scope: This covers Project Life-Cycle Reviews in CLIN 1, CLIN 2 and CLIN 3.

Contents:

- a. The Contractor shall deliver a Project Life-Cycle Review Plan, which includes the reviews identified in the contract requirements Statement of Work (SOW) CLIN #s 1, 2, and 3. The review plan shall describe the process for developing the Joint Integration Plan (JIP) for each applicable review, the review process (including any specific tools and tool training required to conduct the review), schedule, location, deliverables, delivery method, delivery dates, means, and timing by which data will be made available to NASA, document review dates, presentation meetings, Technical Interchange Meetings (TIMs), pre-boards, boards, and other logistics related information. The Contractor shall describe in the Project Life-Cycle Review Plan the approach for review input and disposition, including how to submit comments, when the comments are due, joint disposition process, actions, action recording and tracking, configuration management of review products, and review minutes. The plan shall ensure NASA has adequate time and access to the data to perform meaningful technical reviews. The plan may be segregated into volumes for individual reviews or split up accordingly to optimize incremental updates.
- b. The Contractor shall prepare, jointly with NASA, and deliver for NASA review, feedback and concurrence a JIP specific to the following Project Life-Cycle Review Reviews and Contractor proposed interim milestones in CLIN 2 at least 120 calendar days prior to the review that describes all components required to hold a successful review: Mission Concept Review (MCR), System Requirements Review (SRR), System Definition Review (SDR), Preliminary Design Review (PDR), Critical Design

Review (CDR), System Integration Review (SIR), Assembly Integration and Test Progress Review (APR), System Acceptance Review (SAR), Pre-Ship Review (PSR), Dwell Release Review (DRR). This shall include the review schedule, the review agenda, jointly agreed to detailed entrance and exit criteria, expected NASA and Contractor processes, instructions to the review board, mapping of data requirements to specific Contractor provided products and locations within data pack, etc. The Contractor shall include in the JIP a detailed mapping of the NASA data requirements for each review to the Contractor specific plans, documents, reports, etc. by document number, title, revision, date, and specific location in the data package on where to find that information. The Contractor may include additional data elements above the NASA data elements, which may be beneficial to the Government to aid in its understanding of the Contractor's approach, plans, processes, status, and expected performance to facilitate a successful review. NASA may request additional data elements during the review process to aid its understanding of the Contractor's approach, plans, processes, status, and performance.

- c. The Contractor shall submit a final electronic copy of the Project Life-Cycle Review presentation(s) and all data pack material to NASA at least thirty (30) calendar days before the review is held.
- d. The Contractor shall provide responses to any NASA questions within ten (10) calendar days.
- e. The Contractor shall prepare and deliver the review close-out package to EDMS, with the following documents within seven (7) calendar days following the Project Life-Cycle Review:
 1. Final presentation
 2. Final data package, with updated documents based on the review
 3. Meeting Minutes
 4. List of attendees
 5. Agreements from each review
 6. Actions, actionee, status and due dates, estimated closure date from each review
- f. The Contractor shall prepare, maintain, and deliver an action item list that includes:
 1. Assigned tracking number for each action item
 2. Action
 3. Subject
 4. Due Date
 5. Person or organization responsible for completing the action
 6. Status of action (i.e., open, closed, or withdrawn)
 7. Closure rationale

1.0 Part 1: CLIN 1 Project Life-Cycle Reviews**1.1 Mission Concept Review (MCR)**

The MCR Data Package shall deliver data and presentations to address the MCR elements defined in the SOW Section 3.6 *Mission Concept Review (MCR)*.

1.2 System Requirements Review (SRR)

The SRR Data Package shall deliver data and presentations to address the SRR elements defined in the SOW Section 3.7 *System Requirements Review (SRR)*.

1.3 System Definition Review (SDR)

The SDR Data Package shall deliver data and presentations to address the SDR elements defined in the SOW Section 3.8 *System Definition Review (SDR)*.

1.4 Preliminary Design Review (PDR)

The PDR Data Package shall deliver data and presentations to address the PDR elements defined in the SOW Section 3.9 *Preliminary Design Review (PDR)*.

1.5 Critical Design Review (CDR)

The CDR Data Package shall deliver data and presentations to address the CDR elements defined in the SOW Section 3.10 *Critical Design Review (CDR)*.

2.0 Part 2: CLIN 2 Project Life-Cycle Reviews**2.1 System Integration Review (SIR)**

The SIR Data Package shall deliver data and presentations to address the SIR elements defined in the SOW Section 4.2.4 *System Integration Review (SIR)*.

2.2 Assembly Integration & Test Progress Review (APR)

The APR Data Package shall deliver data and presentations to address the APR elements defined in the SOW Section 4.3.3 *Assembly, Integration, and Test Progress Review (APR)*.

2.3 System Acceptance Review (SAR)

The SAR Data Package shall deliver data and presentations to address the SAR elements defined in the SOW Section 4.4.5 *System Acceptance Review (SAR)*.

2.4 Pre-Ship Review (PSR)

The PSR Data Package shall deliver data and presentations to address the PSR elements defined in the SOW Section 4.5.1 *Shipment to Acceptance Destination*.

3.0 Part 3: CLIN 3 Project Life-Cycle Reviews**3.1 Dwell Release Review (DRR)**

The DRR Data Package shall deliver data and presentations to address the DRR elements defined in the SOW Section 5.1 *Dwell Release Review (DRR)*.

Remarks: The Final Project Life-Cycle Review Plan, paragraph (a) above, as approved, shall

be incorporated in the contract as Attachment J-07, *Project Life-Cycle Review Plan*.

Maintenance: N/A

1. DRD Title: Concept of Operations (ConOps)		
2. DRD No.: USDV-4	3. Data Type: 1	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: <p>The ConOps defines the overall high-level concept of how the USDV will be used and operated. The ConOps establishes a framework for the USDV requirements and operations.</p>		
11. Distribution: <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR ON/USDV Lead</p> <p>Initial Submission: Initial - Provide with Proposal</p> <p>Additional Submissions: Update at MCR; Final at SRR</p> <p>Submission Frequency: Update as required to reflect changes that affect the ConOps</p> <p>Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment.</p> <p>Interrelationship: SOW: 3.5 <i>Contract Kick-Off</i>, 3.6 <i>Mission Concept Review (MCR)</i>, 3.7 <i>System Requirements Review (SRR)</i>, 3.8 <i>System Definition Review (SDR)</i>; DRD: USDV-3</p> <p>Applicable Documents: N/A</p> <p>Scope: The ConOps shall document the planned operational concepts for the USDV. The ConOps shall cover all aspects of the operation of the USDV, including any driving off-nominal cases.</p> <p>Contents: The Concept of Operations (ConOps) shall include:</p> <ol style="list-style-type: none"> a. Description of operations concept including USDV dwell, USDV spacecraft delivery to the launch site, pre-launch processing, pre-mission flight design and planning, launch, activation, free flight, mated operations, and reentry. 		

- b. Planned interfaces between the ISS, Launch Vehicle (LV), and NASA Mission Systems and the USDV
- c. Capabilities and limiting factors (e.g., systems' performance, consumables, thermal, prop, power) of the USDV
- d. System Checkout Objectives
- e. Operation timelines
- f. Operational phases or modes
- g. On-board vehicle management and major differences associated with the operational phases or software modes
- h. Real-time operations support strategy
- i. Communications strategy
- j. Critical Events
- k. Preliminary operations constraints due to design concept.
- l. Risks and potential issues associated with the development and operations of the envisioned system and proposed mitigations.
- m. Description of automated versus manual functions and ability for MCC-H to override automated functions
- n. Description of fault tolerance failover approach and any ground or ISS commanding required
- o. Ability to patch software in real-time and tools required to support this

Remarks: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated, and 2) Redlined version showing the updates made since the last submittal.

The Final ConOps, as approved, shall be incorporated in the contract as Part B of Attachment J-08, *USDV System Architecture and Concept of Operations*.

Maintenance: N/A

1. DRD Title: Insight Management Plan		
2. DRD No.: USDV-5	3. Data Type: 1	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: NASA will utilize the Contractor's Insight Management Plan to ensure NASA personnel and its support contractors can perform their insight as defined in Clause H.9, <i>NASA Insight and Approval</i> .		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OD/ISS Avionics and Software Office OE/ISS Safety and Mission Assurance/Program Risk Office OH/ISS Data Management ON/USDV Lead OH/Assessment Office Initial Submission: Initial - with Proposal Additional Submissions: Final at MCR Submission Frequency: Update as required to reflect changes that affect Insight Management implementation The plan shall be reviewed annually for currency and submitted by Sept. 30 th if updates are required to reflect changes to the plan. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this. Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment. Interrelationship: SOW: 2.6 <i>NASA Insight and Approval</i> , 2.11.8 <i>Supplier Management</i> , 3.6 <i>Mission Concept Review (MCR)</i> ; DRD: USDV-3, USDV-20, USDV-26 Applicable Documents: N/A Scope: The Insight Management Plan describes the Contractor's overall plan for providing the Government insight throughout the contracted scope of work. Contents: The Contractor's Insight Management Plan shall describe how a cooperative		

environment will be established to promote an effective working relationship between NASA and the Contractor dedicated to successful execution of the USDV mission. The Contractor's Insight Management Plan shall describe the accommodations for providing the Government and all NASA-designated personnel (including support contractors) timely and open access to data and information necessary to obtain a working-level understanding into all activities. These accommodations include facility access, data, and any other information including technical and management processes required to meet contract requirements, review and milestone acceptance criteria, and to support approval of Type 1 and 2 data deliverables. The Contractor's Insight Management Plan shall identify instructions or training required to allow for meaningful NASA insight and participation (e.g., facility and safety familiarization).

In addition, the Insight Management Plan shall address Clause H.9, *NASA Insight and Approval* and the following items:

- a. Describe the processes, procedures, and systems, which the Contractor will implement to provide the Government ongoing access to data, both remotely and on-site, in a useable and readable format. Identify if the data that can be accessed includes the ability of the Government to download or copy data; the Contractor's proposed data restriction legends on accessed data; and mechanisms to ensure that access data is not confused with data delivered under the contract. The Contractor shall describe how they will provide information for the USDV system, subsystems, materials, processes, and test equipment. The Contractor shall describe the approach to providing NASA access to performance and anomaly resolution data on non-NASA missions that utilize hardware and software similar to USDV. The Contractor shall also describe the approach to provide the Government the ability to locate and review data used in the performance of this contract and any other information related to the USDV, to include but not limited to:
 1. All deliverables
 2. All technical data to mutually address USDV project and ISS Program risks
 3. Design Analysis/Trades Outcomes and Results along with associated risks and mitigations
 4. Test and performance data as USDV progresses towards acceptance and demonstration
 5. Test and post maintenance reverification activities while in dwell
 6. Manufacturing process, quality records, and any other data for the Government to perform a successful risk-based analysis/assessment (RBA) that will facilitate the identification of high-risk areas and closure of identified Product Assurance Actions (PAAs)
 7. USDV hardware and software acceptance data
 8. Nonconformances
 9. Supporting data/information
 10. Administrative and management information (excluding financial information during Firm Fixed Price CLINs)

- b. The Contractor shall define the timeframe and means in which they will notify the ISS Program designee of Contractor and subcontractor technical meetings, control boards, reviews, demonstrations, test readiness reviews, and tests to permit meaningful Government participation through the entire event. Contractor shall describe how data will be easily made available to all NASA-designated personnel (including support contractors) prior to the event.
- c. The Contractor shall define the timeframe and means in which any joint activities with NASA are communicated to accommodate NASA's participation in accordance with Clause H.9, *NASA Insight and Approval*. Contractor shall describe how data will be easily made available to all NASA-designated personnel (including support contractors) prior to the event as well as during the planning and build up phase of ground testing (e.g., simulator training and evaluations, mockup demonstrations, etc.), and during the flight evaluation process.
- d. Describe how the Contractor will accommodate Government Quality Assurance (GQA) activities.
- e. Describe how the Contractor enables a collaborative and cooperative environment between NASA and the Contractor. This shall include:
 1. How the Contractor establishes working relationships at every level of both organizations that enable both parties to solve problems as a team.
 2. The Contractor's approach and communication plan that permits the parties to mutually mitigate risk and enables a continuous dialogue.
- f. The process by which the Contractor and/or subcontractors resolve concerns and issues. This shall also include:
 1. The process to permit timely elevation of concerns and issues to NASA.
 2. The process to permit elevation of major nonconformances to NASA within 24 hours of identification.
 3. The process to permit timely elevation and resolution of anomalies/issues associated with hardware/software components used, including those used in non-NASA missions.
 4. The process of highlighting critical activities of interest (such as changes, decisions, key testing events, critical meetings) to NASA.
- g. The timely resolution of concerns and issues identified by NASA and its support contractors' insight effort, as well as from NASA's participation in the joint activities.
- h. Accommodating NASA's insight in the Contractor's development and successful fulfillment of operational requirements. This shall include:
 1. The timeliness and ease by which the Contractor will accommodate NASA's insight in the operational activities and make data available to mutually address risks associated with achieving successful demonstrations, tests, completing acceptance milestone review criteria and making progress toward NASA acceptance of the USDV.

2. The timeliness and ease by which the Contractor will accommodate NASA observation of the Contractor's non-USDV vehicle operations to support NASA training activities.
 3. The process of highlighting critical activities of interest (such as changes, decisions, key events, critical meetings) to NASA.
 4. The process to permit timely elevation of issues to NASA.
 5. The process to allow the capability for NASA and its support service contractors to request, capture, and upload/download imagery of the USDV and ground support equipment for NASA use throughout all phases of the USDV contract.
- i. The Contractor shall describe the provisions for accommodating a Government Resident office co-located on-site at the Contractor's facility. The Contractor shall describe their approach to badging, furniture, telephones, and use of easily accessible data lines and copy machines, for full-time and temporary Government insight and support contractor personnel in performance of this contract, including training. This shall include:
 1. Co-located on-site accommodations clearly identified.
 - j. Innovative use of technology that enables effective participation for completing NASA insight, project life-cycle reviews, and NASA approvals.
 - k. The process of providing the Government insight into subcontractors and suppliers performing or supporting work associated with this contract.

Remarks: The Final Insight Management Plan, as approved, shall be incorporated in the contract as Attachment J-09, *Insight Management Plan*.

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Work Breakdown Structure (WBS) and WBS Dictionary		
2. DRD No.: USDV-6	3. Data Type: 2	4. OPR: Program Planning & Control (OH)
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input checked="" type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: To establish a product-oriented framework for reporting program cost, schedule, and technical performance. To provide a basis for uniform planning, reporting status, program visibility, and assignment of responsibilities.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OH/ISS Data Management LC/ISS Resource Management Office OH/Assessment Office Initial Submission: Initial with proposal Additional Submissions: 30 calendar days after Contract Award, update as required for currency. Submission Frequency: N/A Format: Electronic in Microsoft Word compatible with the Program authorized repository. The WBS shall be in a chart format showing element relationships. The WBS Dictionary shall be ordered in consonance with the WBS index and shall reference each WBS element by its identifier and name. Interrelationship: SOW: 2.2.2 <i>Resource Management</i> ; DRD: USDV-7, USDV-8 Applicable Documents: N/A Scope: The WBS establishes a product-oriented logical subdivision of hardware, software, services, facilities, etc., that make up the total project scope of work. The WBS Dictionary provides a narrative description of the tasks and effort to be performed in each WBS element. Contents: The Work Breakdown Structure (WBS) and WBS Dictionary are two distinct		

project documents used for defining the approved project scope of work. The contents of each document are detailed in the following paragraphs:

WBS: A logical, hierarchical display of the subdivision of all project work to be completed.

- a. The WBS shall include the approved element title and element number.
- b. The WBS shall subdivide the total contracted effort into elements that serve as the basis for detailed planning and control of the project, and permit collection of cost and schedule data.
- c. The WBS shall include all subcontracting and major procurement efforts.
- d. The WBS shall be product-oriented and structured so that key Statement of Work (SOW) tasks are at an appropriately high level.
- e. WBS Element Level: Enter the level of the WBS element. Level 1 is the total contract. Levels 2, 3, and so on, are successively lower levels of the contract.
- f. WBS Element Title: Enter the title of the Contract WBS (CWBS) element using the specific name or nomenclature.

WBS Dictionary:

- a. The WBS dictionary shall describe and document the work content of every WBS element and relevant efforts associated with each element.
- b. The WBS dictionary shall be arranged in the same order as the contract WBS.
- c. The WBS dictionary shall include the following for each WBS element:
 1. WBS element title.
 2. WBS element code.
 3. WBS element content description (including quantities, relevant associated work, and contract end items where applicable).
 4. WBS Index.
 5. SOW paragraph number.
 6. Specification (number and title) associated with the WBS element (if applicable).
 7. Date, revision number, revision authorization and approved changes.
 8. Contract Identification Number.
 9. Budget and reporting number (i.e., Charge Code)
- g. The contractor shall provide a complete description of the technical, cost, and work content of each WBS element. For the technical content, the dictionary must include a general system level description (i.e., highest level WBS element) of the end item that captures top-level attributes of the system. The contractor shall provide general descriptions of the physical characteristics of each individual element below the system level. It is important that the contractor specify all hardware and software equipment that are associated with each WBS element. Each WBS element definition must provide the end user with the means to determine what the item is, what it does

within the system, and how the item is physically defined.

- h. The WBS dictionary shall include a description of the cost and work content for each element. Cost content definitions must include explanations of recurring versus nonrecurring efforts, functional cost element inclusion or exclusion, and purchased versus made in-house decisions. The description of the cost content must also include characterizations by functional category (i.e., engineering, tooling, quality control, and manufacturing) as appropriate. The cost content portion of the definition for each element should be tied to the contractor's control account, work package, and work scope definitions. The work content definition must include a short description of the process used to design, produce, or sustain the end item or service. The description must address the types of activities (e.g., design, production, analysis, or management) included within the WBS element. These descriptions must include information on whether the reporting contractor or a supplier/subcontractor is performing the work being described.
- i. The WBS dictionary shall reflect only the work being done on the contract for which the document is being submitted. If work is not expected to occur for a given WBS element, the WBS dictionary definition must indicate that this element is not applicable. If work at some elements is being performed by a supplier/subcontractor, the dictionary must state this. Similarly, if the WBS is for a subcontract/supplier, the work defined for each element must be specific to the subcontractor/supplier's scope of effort and must not include the prime contractor's work. Definitions of a generic nature are acceptable for some parent level elements provided that more detailed definitions are given for the lower-level elements. If there are Government Furnished Equipment (GFE) items being integrated into the end item, it is not expected that a detailed description of those items be provided, however, all GFE items being integrated into the system as part of the contract must be labeled as such in the CWBS dictionary under the appropriate elements.

Remarks: Reference NPD 7120.4, *NASA Engineering and Program/Project Management Policy*, and NPR 7120.5, *NASA Space Flight Program and Project Management Requirements*, NPR 7120.7, *NASA Information Technology and Project Management Requirements*, NPR 7120.8, *NASA Research and Technology Program and Project Management Requirements*, *NASA Work Breakdown Structure (WBS) Handbook*.

Maintenance: Change shall be incorporated by complete reissue.

1. DRD Title: Integrated Program Management Data Analysis Report (IPMDAR)		
2. DRD No.: USDV-7	3. Data Type: 3	4. OPR: OH
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input checked="" type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The IPMDAR contains data for measuring contract execution progress on NASA contracts. The IPMDAR's primary purpose to the Government is to reflect current contract performance status and the forecast of future contract performance. The IPMDAR consists of the following three components: <ul style="list-style-type: none"> • Contract Performance Dataset (CPD). Provides performance/execution data from the contractor's existing management systems. • Schedule (Comprised of both the Native Schedule File and the Schedule Performance Dataset (SPD)). Provides data from the contractor's Integrated Master Schedule (IMS). • Performance Narrative Report (PNR). Provides narrative analysis of data provided in the CPD and the Schedule. The PNR is comprised of both the Executive Summary and the Detailed Analysis Report. 		
11. Distribution: One electronic copy to a Program authorized repository (EDMS or equivalent). Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OH/ISS Data Management LC/ISS Resource Management Office OH/Assessment Office INITIAL SUBMISSION (DID 1.8.1): The following is due at proposal <ul style="list-style-type: none"> • IPMDAR Native Schedule File (PDF and MPP formats), referred to as Integrated Master Schedule (IMS) • Native Schedule File Data Dictionary (PDF format) • Schedule Assumptions (PDF format) • Performance Narrative Report (limited to the following elements) <ul style="list-style-type: none"> ○ Executive Summary – Summary Master Schedule (PDF format) ○ Detailed Analysis Reports – Schedule Risk Assessment (PDF format) Additional Submissions: See Submission Frequency		

SUBMISSION FREQUENCY (DID 1.8.1):

IPMDAR CPD, Schedule (Native Schedule File and SPD) and PNR (Executive Summary and Detailed Analysis) shall be submitted monthly through incremental delivery. The following is the monthly increment delivery schedule:

- The Native Schedule File and SPD shall be delivered no later than the 5th Government working day after the close of the contractor's monthly accounting period.
- The CPD and Executive Summary shall be delivered no later than the 10th Government working day after the close of the contractor's monthly accounting period.
- The Detailed Analysis Report shall be delivered no later than the 16th Government working day after the close of the contractor's monthly accounting period.

All final components shall be delivered no later than the 16th Government working day after the end of the contractor's monthly accounting period.

Data is not considered authoritative until the final submission and signed by the USDV Contractor Program Manager.

Native Schedule Data Dictionary: Update required for any change following the initial submission due with the first affected IPMDAR deliverable.

Schedule Assumptions: Update required for any change following the initial submission due with the first affected IPMDAR deliverable.

Format:

Electronic Submission and Files shall be prepared in accordance with section 1.6 of DI-MGMT 81861C and shall be submitted in a human-readable file format (e.g., PDF, XLSX, DOCX), containing searchable text, in accordance with the contractor's internal system description. Native Schedule Format shall be delivered in both PDF and MPP formats.

Interrelationship:

To ensure an integrated approach to risk management, the information within the data provided by this IPMDAR DRD shall be consistent with the following DRDs when required: *Work Breakdown Structure (WBS) and Dictionary (DRD USDV-6)*, *Risk Management Plan (DRD USDV-19)*, and *Contractor Financial Management Report (NF533) (DRD USDV-8)*. The *Contractor Financial Management Report (NF533)* shall include reconciliation between the (533M [Monthly]/533Q[Quarterly]) and the IPMDAR, which shall be submitted as an attachment to the 533M/533Q reports and shall also be included in the Performance Narrative Report of the IPMDAR.

SOW: 2.2.1 Scheduling, 2.2.2 Resource Management; **DRD:** USDV-2, USDV-6, USDV-8, USDV-11, USDV-19

Applicable Documents:

- Data Item Description (DID), Integrated Program Management Data Analysis Report, DI-MGMT-81861 (Rev C):_ https://quicksearch.dla.mil/qsDocDetails.aspx?ident_number=278901
- DID DI-MGMT-81861 (Rev C) Data Exchange Instructions: Contract Performance Dataset (CPD):_ <https://www.acq.osd.mil/asda/ae/ada/ipm/docs/20200312%20Contract%20Performance%20Dataset%20-%20DEI.pdf>
- DID DI-MGMT-81861 (Rev C) Data Exchange Instructions: Schedule Performance Dataset (SPD)_ <https://www.acq.osd.mil/asda/ae/ada/ipm/docs/20200312%20Schedule%20Performance%20Dataset%20-%20DEI.pdf>

Scope: The IPMDAR consists of the following three components:

- Contract Performance Dataset (CPD). Provides performance/execution data from the contractor's existing management systems.
- Schedule (Comprised of both the Native Schedule File and the Schedule Performance Dataset (SPD)). Provides data from the contractor's Integrated Master Schedule (IMS).
- Performance Narrative Report (PNR). Provides narrative analysis of data provided in the CPD and the Schedule. The PNR is comprised of both the Executive Summary and the Detailed Analysis Report.

Contents:

The Contractor shall submit monthly IPMDAR inclusive of all elements required in Data Item Description (DID) DI-MGMT-81861C, Integrated Program Management Data and Analysis Report (IPMDAR), with the following modifications/tailoring as specified below.

Disregard paragraphs of DI-MGMT-81861C requiring data to be submitted to the Office of the Under Secretary of Defense (OUSD) Acquisition, Data and Analytics (ADA) Integrated Program Management (IPM) Division the Earned Value Management Central Repository (EVM-CR). The IPMDAR is to be submitted to the distribution list specified Section 11 of this DRD.

- **Contract Performance Dataset (CPD)(Applies to CPIF only):** Provides monthly delivery of performance and execution data at the Control Account, and shall include:
 - Monthly phased plan, performance, actuals, and forecast for both dollars and workforce through completion of as time-phased non-cumulative values.
 - **Non-Cumulative Time Phased Data to Date (DID 1.6.1.1):** A Historical Contract Performance Data file is required annually in October of each contract year in place of the normally provided CPD covering September month end.

- **Schedule:** Comprised of both the Native Schedule File and the Schedule Performance Dataset (SPD):
 - The Native Schedule File, or Integrated Master Schedule (IMS), is an integrated, logically driven, network-based schedule that is vertically and horizontally traceable.
 - 2.4.3.1. SPD Custom/User-Defined Fields: Contractor will reserve [x number] schedule fields as defined below for the purpose of helping the Government navigate, analyze, and health-check the IMS.
 - Schedule Performance Dataset (SPD):
 - Critical Path (DID 2.4.2.13): The schedule tool shall automatically calculate the longest path in the Native Schedule File. If multiple critical paths are identified, the Native Schedule File also includes a custom field for Critical Path ID.
 - Constraints (DID 2.4.2.18): Identify the constraints (including any deadlines) applied to tasks. Provide justification for all constraints external to the Native Schedule file.
 - Leads/Lags: Justify the lead/lag duration external to the Native Schedule file. If external to the native Schedule file, provide justification in the PNR.
 - SPD Custom/User-Defined Fields (DID 2.4.3.1): The Contractor shall include six (6) schedule fields as defined below for the purpose of helping the Government navigate, analyze, and health-check the IMS
 - Deliverable Items List (DIL) – Hardware/Software Deliverable Dates
 - Government Task Agreements (GTA) – Key Dates for Contractor and Government Activities
 - Project Life-cycle Reviews
 - Additional three (3) to be added upon request based on Government needs during contract execution
 - Resources (DID 2.4.3.2): The submission of a resource loaded native schedule is required (*applies to CPIF only*).
- **Performance Narrative Report:** Comprised of both the Executive Summary and the Detailed Analysis Report
 - **Executive Summary (DID 2.5.2):** monthly report including:
 - Summary Master Schedule – A one-page, top level, Gantt-type schedule chart traceable to the IMS that summarizes the contracted effort including period of performance and major milestones, critical path, schedule margin, schedule baseline, and current forecast-to-complete.

- Control Milestone (CM) Trend Report – A cumulative trend chart consisting of the baseline CMs and their corresponding finish dates.
 - Schedule Margin – Changes in the critical path influenced by the inclusion of schedule margin tasks in the IMS, as well as changes to the status of schedule margin tasks that impact the critical path.
 - Schedule Margin Trend Report – An accounting of planned and remaining schedule margin displayed in a trend format with explanations for changes during the month reported must be presented.
 - Critical Path Report – An extract or set of views from the contract IMS identifying the critical path, secondary path, and tertiary path, including all associated tasks and milestones along the path.
- **Detailed Analysis (DID 2.5.3):**
- Variance Analysis Selection (DID 2.5.3.4):
 - Based on review of interim monthly submissions, the Government shall identify up to 25 variances per month for the contractor to report. The Government will notify the contractor of the variances to be included no later than 13 government business days after the close of the contractor’s accounting period.
 - Variance analysis shall be presented using dollars (*applies to CPIF only*) and schedule as the basis. If there are no changes to the reported element problem analysis, expected impacts, or corrective action status, the contractor may specify “no changes since the last reported analysis” and reference the IPMDAR date when the narrative was reported.
 - Schedule Risk Assessment (SRA) (DID 2.4.2.21):
 - SRAs are required at the following times:
 - With proposal
 - Semi-annually, April 15th, with the delivery covering the March month end, and October 15th, with the delivery covering the September month end. The semi-annual SRA delivery may be combined with the project lifecycle SRA delivery when the delivery due dates are within 45 calendar days of each other. The contractor shall pre-coordinate delivery date in advance with NASA.
 - Prior to an Integrated Baseline Review (IBR) (*applies to CPIF only*),
 - Prior to Over Target Baseline/Over Target Schedule

(OTB/OTS) (*applies to CPIF only*),

- As part of Project Lifecycle Review data packages per SOW.
- Upon request to support Government Estimate-at-Complete (EAC) processes(*applies to CPIF only*).
- Upon request by the Government, the contractor must provide the probabilistic SRA in its native file format.
- The results of the SRA must include the probability of meeting contractual deliveries and milestones in histogram/S-curve formats.
- The SRA results must also include rank order “tornado diagrams” of both the risks and tasks affecting the completion of contractual milestones and deliverables.
- Staffing Changes and Rates – shall be reported if either element has or can be reasonably expected to have a major impact on the effort’s cost (*applies to CPIF only*) and/or schedule forecast.
- Major Subcontractors – shall be reported if there were any changes in the reporting period or expected in the next three months.
- Rate Impacts – Identify impact of rate changes to Estimate at Complete (EAC) and/or Management Reserve (*applies to CPIF only*). Provide cumulative rate impacts by fiscal year for each year of the contract and explanations for rate increase and/or decreases. Include prime and subcontractor rate impacts as well as any known forecasted rate impacts, which may impact the contract in the future.
- Cost burndown trace of shifting tasks between Government Fiscal Years (GFYs) (*applies to CPIF only*): Provide a cost burn down trace of shifting tasks from prior and current GFYs to future GFYs, which includes total cost by task shifted from prior and current GFY to future GFY, actual cost by shifted task burned down to date, and forecast remaining cost by shifted task phased according to GFY.

Cost Data reported shall reflect all negotiated Cost-Reimbursable contract work and include the total scope of Authorized Unpriced Work (AUW) efforts. (*Applies to CPIF only*)

Schedule Data shall reflect all negotiated CLIN1 through CLIN5 contract work and include the total scope of Authorized Unpriced Work (AUW) efforts.

Remarks: The IMS will be baselined after ATP as agreed to by both parties and not to exceed 90 calendar days after ATP.

Reference is made to NPR 7120.5 (Current Revision), *NASA Space Flight Program and Project Management Requirements*, NPR 7120.7 (Current Revision), *NASA Information Technology Program and Project Management Requirements*, NPR 7120.8, (Current Revision), *Research and Technology Program and Project Management Requirements*, and

NASA Schedule Management Handbook (current revision).

The following guides documents are available as reference to aid in the preparation of the IMPDAR:

- NASA IPMDAR Tailoring Supplement:
https://www.nasa.gov/sites/default/files/atoms/files/nasa_ipmdar_tailoring_supplement.pdf
- DOD IPMDAR Implementation and Tailoring Guide:
https://www.acq.osd.mil/asda/ae/ada/ipm/docs/IPMDAR%20Implementation%20and%20Tailoring%20Guide_Stamped.pdf
- DID DI-MGMT-81861 (Rev C) File Format Specification: Contract Performance Dataset (CPD):
<https://www.acq.osd.mil/asda/ae/ada/ipm/docs/20200312%20Contract%20Performance%20Dataset%20-%20FFS.pdf>
- DID DI-MGMT-81861 (Rev C) File Format Specification: Schedule Performance Dataset (SPD):
<https://www.acq.osd.mil/asda/ae/ada/ipm/docs/20200312%20Schedule%20Performance%20Dataset%20-%20FFS.pdf>

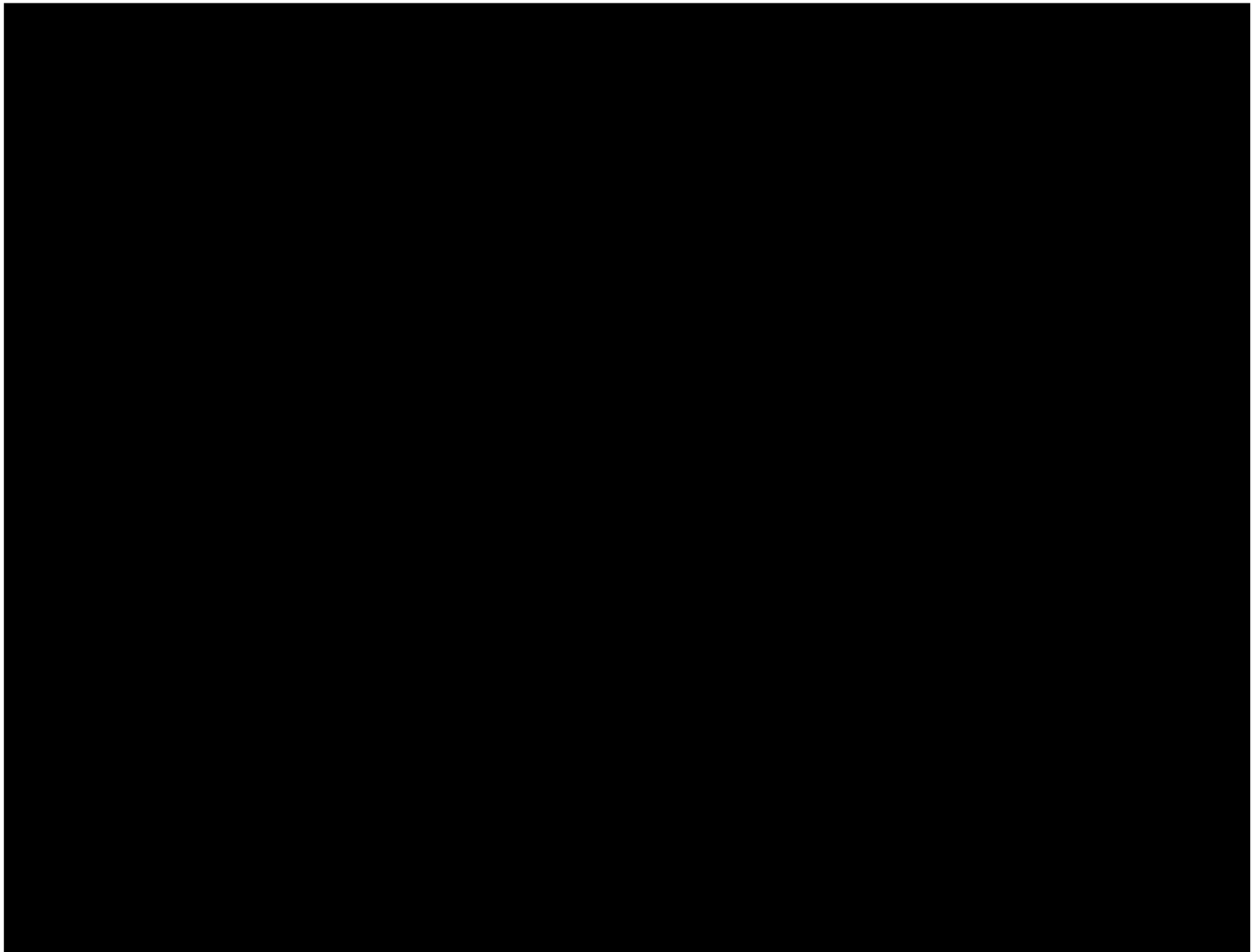
USDV-7 will be updated to be compliant with current version of DI-MGMT-81861.

The IMS shall be incorporated in the contract as Attachment J-29, *Integrated Master Schedule*.

The IPMDAR data shall be consistent and reconcile with the 533 data (USDV-8)(*applies to CPIF only*) and PMR data (USDV-2). Any deviations must be explained.

Maintenance: Changes shall be incorporated by change page or complete reissue.

1. DRD Title: Contractor Financial Management Report (NF533) (Date of Version: 5/23/2023)		
2. DRD No.: USDV-8	3. Data Type: 3	4. OPR: LC
5. Solicitation No.: 80JSC023R0003	6. Contract No.: 80JSC024CA002	
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input checked="" type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: Provide a basis for reporting and evaluating cost and expenditure in support of this contract. The data contained in the reports must be auditable using Generally Accepted Accounting Principles (GAAP), Supplemental cost reports submitted in addition to the NASA Form (NF)533, <i>Monthly Cost Reporting</i> must be reconcilable to the NF533.		



11. Distribution:

1 Electronic Signed Copy: Program Authorized Repository (EDMS or equivalent)

Program Authorized Repository Upload Notification:

BG/CO

OA/COR and Alternate COR

OH/ISS Data Management

LC/ISS Resource Management Office

OH/Assessment Office

LG/ Cost Accounting

Initial Submission:

Initial Baseline Report submitted in 533Q Format due within 30 working days after contract award.

NF533M reporting shall begin no later than 10 days following the close of the contractor's accounting period after initial incurrence of cost.

Additional Submissions: NF533M: Due no later than the 10th working day following the close of the contractor's accounting period or the 15th calendar day of the month, whichever is earlier.

NF533Q: Due no later than the 15th calendar day of the month preceding the quarter being reported.

Submission Frequency: NF533M: Due no later than the 10th working day following the close of the contractor's accounting period or the 15th calendar day of the month, whichever is earlier.

NF533Q: Due no later than the 15th calendar day of the month preceding the quarter being reported.

Format: electronically signed PDF file, electronically MS Excel file, and flat file described below

Interrelationship: SOW: 3.1 *Resource Management*; DRD USDV-2, USDV-6, USDV-7, USDV-9, USDV-11

Applicable Documents: NPR 9501.2E, *NASA Contractor Financial Management Reporting*

Scope: NF533 *Monthly Cost Reporting*. The Monthly report shall provide a report for projecting costs and equivalent personnel) for evaluating Contractor's actual cost and fee, for the planning, monitoring, and controlling of project and program resources, and for accruing cost.

Content:

The NF533 reports provide data necessary for the following:

1. Projecting costs and hours to ensure that dollar and labor resources realistically support project and program schedules.
2. Evaluating contractors' actual cost and fee data in relation to negotiated contract value, estimated costs, and budget forecast data.
3. Planning, monitoring, and controlling project and program resources.
4. Accruing cost in NASA's accounting system, providing program and functional management information, and resulting in liabilities reflected on the financial statements.

Cost is a financial measurement of resources used in accomplishing a specified purpose, such as performing a service, carrying out an activity, acquiring an asset, or completing a unit of work or project. NASA Procedural Requirements (NPR) 9501.2E, entitled “*NASA Contractor Financial Management Reporting*,” or its most current revision, identifies the cost reporting requirements for a contract. An NF533 format is provided in *Appendix A*.

NASA is required by law to maintain accrual accounting, which requires cost to be reported in the period in which benefits are received, without regard to time of payment.

The reports (NF533M (Monthly) and NF533Q (Quarterly)) are the official cost documents used at NASA for cost type, price determination, and Fixed Price Incentive contracts. The data contained in the reports must be auditable using Generally Accepted Accounting Principles (GAAP). Supplemental cost reports submitted in addition to the NF533 must be reconcilable to both the NF533M & NF533Q. All NF533 reports submitted shall limit values to the second decimal.

Monthly reporting is only required on the Cost-Plus portion of the contract and not any Firm-Fixed Price content.

Common NF533 Cost Elements

Examples of accrual accounting for common cost elements reported on the NF533 follow:

Cost Elements	Definitions
<i>Labor</i>	Reported to NASA as hours and cost are incurred.
<i>Equipment & Materials (commercial off the shelf)</i>	Generally reported to NASA when received and accepted by the contractor.
<i>Manufactured Equipment</i>	Defined as any equipment that is produced to specific requirements that make it useless to anyone else without rework. Cost should be reported to NASA as the equipment is being manufactured. The straight-line method for estimating accrued costs, or the use of supplemental information obtained from the vendor, are acceptable methods used to calculate the cost accrual amount.

<i>Leases</i>	Reported to NASA using a proration over the life of the lease.
<i>Travel</i>	Reported to NASA as costs are incurred.
<i>Subcontracts & Other Direct Costs</i>	Actual and estimated costs reported by prime contractors shall include subcontractors' incurred costs for the same accounting period. Where subcontract costs are material, they should be separately identified on NF533 reports. The prime contractor shall include in the total cost of each subdivision of work the accrued cost (including fee, if any) of related subcontractor effort. Subcontractors should, therefore, be required to report cost to the prime contractor, using the accrual method of accounting. If the General & Administrative (G&A) and fee reported by a subcontractor are at the total subcontractor level, these costs must be allocated to specific sub- divisions of work. Data submitted by the subcontractor should be structured similar to the prime contractor's NF533 to enable the prime contractor to properly report to NASA. For Firm Fixed Price subcontracts with a contract value greater than \$500,000, the prime contractor is required to document the methodology used to generate the sub-contractor costs reported and provide this information to the NASA CO and Center Deputy Chief Financial Officer of Finance.
<i>Unfilled Orders</i>	Reported as the difference between the cumulative cost incurred to date and amounts obligated to suppliers and subcontractors.
<i>Fee</i>	Fee should be reported on the NF533 following the "Total Cost" line. Award fee must be reported by the following categories: Base Fee, Fee Earned, Interim Fee, Provisional Fee, Potential Additional Fee, and Total Fee. If any of the above fee categories do not pertain, they should not be included in the NF533.
<i>Prompt Payment Discounts</i>	Cumulative cost reported to NASA should be the full incurred cost. The prompt payment discount amount taken should be reported as a separate line item on the NF533 below the cumulative cost amounts for the contract.

Common NF533 Data Columns

The following NF533 Data Columns shall be included:

Data Element Name	Description
<i>Reporting Category (RC)</i>	Task, Delivery Order, Work Breakdown Structure
<i>Cost Incurred for Month (7a)</i>	Prior month actual cost incurred for each RC (column 7a on NF533)
<i>HR/Workforce Year Equivalent (WYE) Incurred for Month (7a)</i>	Prior month actual HR/WYE incurred for each RC (column 7a on NF533)
<i>Contract prior month planned cost (7b)</i>	Planned cost for prior month for each RC (column 7b on NF533)
<i>HR/WYE contract prior month planned hours (7b)</i>	Prior month planned HR/WYE for each RC (column 7b on NF533)
<i>Contract Inception to Date (ITD) cost (7c)</i>	Contract ITD cost for each RC (column 7c on NF533)
<i>Contract planned (ITD) cost (7d)</i>	Contract planned ITD cost for each RC (column 7d on NF533)
<i>Current Fiscal Year (FY) Cum to Date Actual (7c1)</i>	Actual cumulative cost and hours incurred for the current Government FY through the prior month for each RC (column 7c1 on NF533)
<i>Current FY Cum to Date Planned (7d1)</i>	Planned cumulative cost and hours for the current Government FY through prior month for each RC (column 7d1 on NF533)
<i>Current month estimated cost (8a)</i>	Cost estimate (not Plan) for the current month for each RC (column 8a on NF533)
<i>Current month estimated HR/WYE (8a)</i>	HR/WYE estimate (not plan) for the current month for each RC (column 8a on NF533)
<i>Next month estimated cost (8b)</i>	Estimated cost for next month for each RC (column 8b on NF533)
<i>Balance of Contract (8c)</i>	Balance of contract for the remaining estimate to complete for each RC (column 8c on NF533)
<i>Government FY Estimate at Complete (EAC) (8d)</i>	Actual cumulative cost and hours incurred plus remaining estimated cost and hours for the current Government FY (column 8d on NF533)
<i>Contractor Estimate (9a)</i>	Contractor estimate for the total ETC entire scope of contract for each RC (column 9a on NF533)
<i>Contract Value (9b)</i>	Contract value based upon contract

	modifications for each RC (column 9b on NF533)
<i>Unfilled orders outstanding (10)</i>	Unfilled orders outstanding at the end of the reporting period for each RC (column 10 on NF533)
<i>Reporting Category level</i>	Used by NASA's accounting system to determine the RC level
<i>Reporting Category Identifier</i>	Identifies if the RC is an actual Reporting Category or a Sub-Reporting Category

The Contractor is required to coordinate with the NASA Resource Analyst assigned to the contract in order to establish and maintain the Reporting Categories the contractor shall use to comply with this data requirement. A Reporting Category (RC) correlates to a task order, delivery order, or Work Breakdown Structure (WBS) and is the level at which cost is reported. Each RC can have Sub-Reporting Category line items (detailed cost elements) that add up to a RC.

Column 7b (planned cost incurred/hours worked for the month) and 7d (cumulative planned cost incurred/hours worked) of the NF533M represent the negotiated baseline plan for the contract. There may not be a relationship between the estimates provided in columns 8 of the NF533M to columns 7b and 7d. Columns 7b and 7d represent the legally binding contract negotiated baseline plan plus all authorized changes.

Uncompensated overtime hours worked should be reported on NF533 reports as a separate line item or in the footnotes.

Short and long-term cost estimates, which include all data entered in columns 8 and 9a on the NF533M and NF533Q reports, shall be based on the most current and reliable information available.

Prior period cost adjustments shall be reported in column 7a and 7c of NF533M and column 7a of the NF533Q as soon as identified. In a footnote, the cost adjustment shall be delineated by government fiscal year, discuss the reasons for, the amounts of, and the time period for which the adjustment(s) relate.

Property, Plant & Equipment (PP&E) Reporting

(A) For PP&E items the contractor plans to purchase, fabricate, or modify, the contractor shall obtain, from the Johnson Space Center (JSC) Finance Property Office, the NASA Capitalization/Expense determination. This determination shall be obtained by the contractor prior to any cost being incurred for the PP&E purchase/fabrication/modification. This will help ensure appropriate 533 reporting for items identified as capital. The capitalization/expense determination governs the contractor's cost reporting requirements associated with the PP&E.

The JSC Finance Property Office makes the capitalization/expense determination based on information provided by the NASA Project Manager, using the Form NF1739 *Capitalization Determination Form*, which is required for each asset valued at, or greater than \$500K. The JSC

Finance Property Office may utilize a supplemental questionnaire and/or additional communication with the project manager, or their associates, to ensure adequate information is obtained to make the appropriate accounting treatment determination (i.e., to Capitalize or Expense the asset).

(B) For PP&E purchased, fabricated or modified, and determined by the JSC Finance Property Office to be Capital, the contractor shall:

1. Report the costs (including fee) of each capital asset (i.e., each individual end item deliverable) as a separate reporting category on the NF533 or other required cost reporting format.
2. Maintain a reporting structure that allows for the contractor's accumulation and reporting of cost (including fee) separately for each identified capital asset (i.e., each individual end item deliverable).

(C) For PP&E purchased, fabricated or modified, and determined by the JSC Finance Property Office to be Expensed (Non-Capital), the contractor is not required to report costs at the detail asset level (i.e., as a separate RC on the NF533 or other required cost reporting format).

NF533 Due Dates

The due dates for the Initial Baseline Report, NF533M and NF533Q reports are outlined in Chapter 3 of NPR 9501.2E, *Contractor Financial Management Reporting*. The following is a summary of the NF533 due date requirements:

NF533 Report	Due Date
<i>Initial Baseline Report (submitted in the NF533Q format)</i>	Due within 30 working days after contract award.
<i>NF533M</i>	Due no later than the 10 th working day following the close of the contractor's accounting period or the 15 th calendar day of the month, whichever is earlier.
<i>NF533Q</i>	Due no later than the 15 th calendar day of the month preceding the quarter being reported.

Due dates earlier than the standard dates set forth above are encouraged whenever feasible. No due date shall be permitted, which is later than the date by which the NASA Center Financial Management Office needs the data in order to enter an accurate monthly cost accrual in the accounting system. All due dates are firm, and changes will only be considered for declared holidays and or the center closures due to extenuating circumstances, and all deviations to the due

dates need to be coordinated and approved by the Office of the Chief Financial Officer and contracting officer.

The due dates reflect the date the NF533 reports are received by personnel on the distribution list, not the date the reports are generated or mailed by the contractor. It is critical that the NF533 reports are submitted in a timely manner to ensure adequate time for NASA to analyze and record the cost into the NASA accounting system.

An initial Baseline report is required (in the NF533Q format) to be used as a baseline for the life of the contract. The initial baseline report shall be submitted by the contractor within 30 working days after contract award. The initial report shall reflect the original contract value detailed by negotiated reporting categories and shall be the original contract baseline plan. Any contractual changes to the initial baseline report should be worked with the CO. Contractual changes are defined as scope changes; i.e., extended period of performance, content de-scope, scope increase, etc., which should not be retroactive to the start of the contract. All changes made to the initial baseline report should be reconciled and documented.

NF533M reporting shall begin no later than 10 days following the close of the contractor's accounting period after initial incurrence of cost.

NF533 Final Submission Upon Contract Completion

Monthly NF533 reporting is no longer required once the contract is physically complete, provided the final cost report includes actual cost only (no estimates or forecasts). The contractor must continue to submit monthly NF533 reports as long as estimates for the following period are included. The final NF533 M should be clearly identified as such and shall only contain actual cost. If the final cost of a contract changes after the submission of the "final" contractor cost report, the contractor must submit a revised NF533 report in the month the cost change is recognized.

However, a significant amount of time may pass between completion of work on a contract and final closeout, due to final reporting, payment and acceptance requirements, property disposal considerations, and other administrative matters. If no significant additional costs are being incurred or are anticipated, then one of the following alternatives may be directed by the NASA CO, with concurrence of the NASA Center Chief Financial Officer and cognizant Project Manager:

- a. Summary NF533M reporting only on a quarterly basis.
- b. Reporting only when changes in actual cost occur.
- c. Suspension of NF533 reporting altogether.

Electronic NF533 Flat File Requirement

An electronic NF533 in a flat file format is required from the contractor to NASA by the same due date. The data shall be submitted via email using the Government prescribed flat file format (see Appendix D for an example of the Agency Defined File Format layout details).


NF533 Report Distribution


See Appendix C JSC DATA REQUIREMENTS LIST (DRL) based on JSC-STD-123. NASA policy requires Controlled Unclassified Information (CUI)_ data file types be encrypted prior to being uploaded/sent to NASA. Any CUI data requires the documentation clearly labeled as “Control Unclassified Information” and emails containing CUI data be encrypted.

NF533 Supplemental Reporting

Supplemental reporting requirements will be submitted during the course of the contract in accordance with direction in *Appendix B*.

APPENDIX A. NF533 Format

 <p>National Aeronautics and Space Administration</p>	Monthly Contractor Financial Management Report					NASA form 533M Form Approved O.M.B. No. 2700-0085		PAGE ____ OF ____ PAGES						
	TO:	FROM:				3. CONTRACT VALUE								
	1. DESCRIPTION OF CONTRACT	a. TYPE:	d. CONTRACT NUMBER AND LATEST DEFINITIZED MODIFICATION NUMBER				4. FUND LIMITATION:							
		c. SCOPE OF WORK:	e. AUTHORIZED CONTRACTOR REPRESENTATIVE Type Name: Signature:			DATE:		5. BILLING		a. INVOICE AMTS BILLED	b. TOTAL PYTS RECEIVED			
6. REPORTING CATEGORY	7. COST INCURRED/HOURS WORKED						8. ESTIMATED COST/HOURS TO COMPLETE				9. ESTIMATED FINAL COST/HOURS		UNFULFILLED ORDERS OUTSTANDING	
	DURING MONTH		CUM TO DATE - ITD		GFY CUM TO DATE		DETAIL				Gyl Fiscal Year EAC ld	CONTRACTOR ESTIMATE 9a		CONTRACT VALUE 9b
	ACTUAL 7a	PLANNED 7b	ACTUAL 7c	PLANNED 7d	ACTUAL 7c1	PLANNED 7d1	CURR MTH ESTIMATE 8a	NEXT MTH ESTIMATE 8b	BALANCE OF CONTRACT 8c	BALANCE OF CONTRACT 8c				
Baseline Plan Identification (Col. 7b & 7c) Revision No. _____ , dated _____														

 National Aeronautics and Space Administration		Quarterly Contractor Financial Management Report			Form Approved O.M.B. No. 2700-0003 Expires: 4/30/2022		2. REPORT FOR QUARTER BEGINNING												
TO:				FROM:				3. CONTRACT VALUE a. COST b. FEE											
1. DESCRIPTION OF CONTRACT	a. TYPE			b. CONTRACT NO. AND LATEST DEFINITIZED MODIFICATION NO.						4. FUND LIMITATION									
	c. SCOPE OF WORK			d. AUTHORIZED CONTRACTOR REPRESENTATIVE			DATE			5. BILLING									
			Type name: _____			Signature: _____			a. INVOICE AMTS. BILLED		b. TOTAL PYTS. RECD.								
8. REPORTING CATEGORY	7. COST INCURRED/ HOURS WORKED			9. ESTIMATED COST/HOURS TO COMPLETE											10. ESTIMATED FINAL COST/HOURS	11. UNFILLED ORDERS OUTSTANDING			
	CUMULATIVE ACTUAL THROUGH PRIOR MONTH	CURRENT MONTH ESTIMATE	CUMULATIVE ESTIMATE TO DATE	Month	Month	Month	Quarter	Quarter	Quarter	Balance of FY-	Next FY-	BALANCE OF CONTRACT	TOTAL TO COMPLETE	CONTRACTOR ESTIMATE			CONTRACT VALUE		
	a.	b.	c.	a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.			l.		

NASA Form 533Q 05/18 (3.8) PREVIOUS EDITIONS ARE OBSOLETE NARS 5/18

https://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N_PR_9501_002E_&page_name=AppendixB

APPENDIX B. Required Supplemental Reporting

Annual Accounting Calendar: The contractor's accounting calendar for the contract period of performance shall be provided in electronic format to the LC resource analyst, and LG Cost Accountant within 10 business days after contract award. Updates to the accounting calendar shall be provided in electronic format to the LC resource analyst and LG Cost Accountant before the delivery of the subsequent NF533.

Contractor Variance Report: The contractor shall submit variance reports along with the NF533M when NF533M variances meet or exceed +/- 5% for each Reporting Category for the following items:

1. Column 7A current month (actuals) to 8A previous month (estimate)
2. Column 7A current month (actuals) to 7B current month (plan)

Monthly Unfilled Orders: The contractor shall submit a report in conjunction with the delivery of the monthly NF533M if there are *Unfilled Orders Outstanding (10)*. The report shall be broken down by reporting category (RC) and include the item description, the originally reported delivery date and costs, updated delivery date and costs, justifications for delays of greater than 30 days, and justifications for changes in costs greater than 5%. The following format shall be used for this report.

A	B	C	D	E	F	G	H
Rept. Category	Item	Original Estimated Delivery Date	Adjusted Estimated Delivery Date	Justification for delays greater than 30 days	Original Estimated Costs	Adjusted Estimated Costs	Justification for cost changes greater than 5%

Quarterly Estimate Report: If the contractor's month-end reporting does not align with the last day of the calendar month, the contractor shall provide a supplemental report for each calendar-month ending a government fiscal quarter (December, March, June, and September). The report shall be broken down by RC and include the original and adjusted 533M *Current Month Estimated Cost and Hours (8a)* that reflects the estimated costs and hours accrued through the last day of the calendar month. All estimated costs shall include unfilled orders expected to be delivered during the adjusted period. The following format **shall** be used for this report.

A	B	C	D	E	F	G
Reporting Category	533M Current Month Estimate (8a) - Costs	533M Current Month Estimate (8a) - Hours	Current Month Est. Adj. (Costs)	Current Month Est. Adj. (Hours)	Total Adj. Current Month Est. (Costs)	Total Adj. Current Month Est. (Hours)
					= B + D	= C + E

Annual Economic Impact Assessment: The contractor shall submit answers to the following four questions back to the LC resource analyst when requested as needed, not to exceed four times a year. The answers should be estimates only, as this requirement is not intended to be an extensive exercise. The information provided will be rolled-up to create Center-level estimates and will not identify any specific contract. This information will not be shared at the contract-level with anyone outside NASA.

1. What was the on-board total headcount for this contract as of September 30th? (Please include in-directs and an estimate for your major subcontractors.)
2. For the total workforce indicated in #1 above, approximately how many worked in the local Clear Lake area, including JSC? (JSC includes JSC proper, Sonny Carter Training Facility, and Ellington Field.)
3. What was the approximate dollar value of goods and services (including labor) purchased in the Houston area under this contract during the prior Government FY?
4. What was the approximate dollar value of goods and services (including labor) purchased outside the Houston area but within the State of Texas?

APPENDIX C. JSC Data Requirements List (DRL)

JSC DATA REQUIREMENTS LIST (DRL)							
Based on JSC-STD-123							
a. Title of Contract, Project, SOW, etc. USDV				b. Contract/RFP No. 80JSC023R0003		c. DRL Date/Mod Date 07/27/2023	
1. Line item no. USDV-8	2. DRD Title Contractor Financial Management Report (NF533)	3. Data type: <input type="checkbox"/> (1) Written approval <input checked="" type="checkbox"/> (2) Mandatory Submittal <input type="checkbox"/> (3) Submitted upon request	4. Frequency As Specified	5. As-of-date	6. 1st subm. date	7. Copies	
						a. Type OTHER	b. Number
	8. Distribution (Continue on a blank sheet if needed) LG Cost Accounting BG Contracting Officer LC ISS Budget/Program Analyst _OA/Contracting Officer Representative and Alternate COR OH/ISS Assessment Office		9. Remarks Copies- Program Authorized Repository: 1 Electronic Copy in PDF format signed, 1 electronic copy in MS Excel format, 1 electronic copy in flat file format as defined in Appendix D LG Cost Accounting: 1 electronic copy in the PDF format with electronic signature				

APPENDIX D. Electronic 533 File Format

May 23, 2023

In order to automate the submittal of the electronic 533 report, contractors must provide a file in the format below.

File names must be provided in a specific format. Each file name will begin with the SAP 2 Character center abbreviation listed below. The contract number and date will be included in the file name as well. Below is a sample file name.

File format needs to be UTF-8 encoded. If generating the file in Excel, save as Type = "Unicode Text". Incorrect formatting could contain hidden characters which would result in a failure when attempting to load the file.

JO80JSC017C0012_2018_01_30

SAP 2 Charter Center Abbreviations

Headquarters	HQ
Dryden	DR
Marshall	MA
Goddard	GO
Ames	AM
Stennis	ST
Glenn	GL
Johnson	JO
Langley	LA
Kennedy	KE

Comments	The data source for this integration is a 533 electronic submittal data file. It will contain a header record for Contract totals; detail records for Reporting Category totals; and a trailer record for file total record counts. If multiple Contracts are to be sent, then a separate file for each contract will need to be submitted.
Data Types	<p>Data Types:</p> <p>CHAR – Character. Includes any letter of the alphabet, any number, and any of the symbols on the keyboard. Character fields are left justified and have a fixed length.</p> <p>DATE – Date. Includes the digits 0 through 9. Dates consist of 8 numeric values in the following format: mmddyyyy (for example: 01012001).</p> <p>NUMERIC (1) - Number. Includes the digits 0 through 9, implicit ONE decimal, and a leading minus sign, if necessary. Numbers are right justified, do not have leading zeros, and may contain values up to the explicit maximum field size.</p> <p>CURRENCY (2) - Includes the digits 0 through 9, implicit TWO decimals, and a leading minus sign, if necessary. Numbers are right justified, do not have leading zeros, and may contain values up to the explicit maximum field size.</p>

Electronic 533 File Format

May 23, 2023

Agency Defined File Format

Header (Non-Repeating Segment)

CCR Extension Data Element	Description	Contractor Initial Data Mapping	533 Required/Optional	Field Name	St Pos	End Pos	Len	Format
HEADER:								
Record Type	Used to determine the record type	'HD' for Header	Required	RECORD_TYPE	1	2	2	CHAR
Contract Number	Contract Number	Header field—submitted with CONTRACTOR data or defaulted by interface or extension	Required	CONTRACT_NUMBER	3	42	40	CHAR (Left Justified)
	Latest definitive Modification Number			MOD_NUMBER	43	48	6	CHAR
Accrual Date	Date the data was generated for.	Accrual Date. MM01YYYY, where MM is the Accrual Month and YYYY is the calendar year	Required	ACCRUAL_DATE	49	56	8	DATE MM01YYYY
Report Period End Date	Report Period End Date	Header field—submitted with CONTRACTOR data or defaulted by interface or extension	Required	REP_END_DATE	57	64	8	DATE

CCR Extension Data Element	Description	Contractor Initial Data Mapping	533 Required/Optional	Field Name	St Pos	End Pos	Len	Format
Operating Days	Operating days	Header field—submitted with CONTRACTOR data	Required	OPER_DAYS	65	70	6	NUMERIC
Date Received	Date Received	System Date upon which the cost data is loaded into the CCR Extension	Required	DATE_REC	71	78	8	DATE
CCR Format	'M' for Monthly and 'Q' for Quarterly	Submitted with CONTRACTOR data	Required	CCR_FORMAT	79	79	1	CHAR
Cost Unit of Measure	Cost Unit of Measure	Submitted with CONTRACTOR data	Required	COST_UOM	80	81	2	CHAR
HR/WYE Unit of Measure	Hour/Work-Year- Equivalent Unit of Measure	Submitted with CONTRACTOR data	Required	HR_WYE_UOM	82	83	2	CHAR
	Authorized Contractor Representative – Name of Contractor Approving Officer			AUTH_SIGNATURE	84	108	25	CHAR
	Authorized Contractor Representative Date Signed – Date CCR is approved/signed by authorized contractor representative			AUTH_SIGNATURE_DATE	109	116	8	DATE MMDDYYYY
Grand Total Cost Incurred Month (7a)	The Grand Total Contract Prior Month Actual Dollars Column 7a reports actual costs for the prior month.	Submitted with CONTRACTOR data	Required	GT_COST_INCUR_MONTH	117	129	13	CURRENCY(2)

CCR Extension Data Element	Description	Contractor Initial Data Mapping	533 Required/ Optional	Field Name	Start Pos	End Pos	Len	Format
Grand Total HR/WYE (7a)	The Grand Total Contract Prior Month Actual Hours Column 7a reports actual HR or WYE for the prior month.	Submitted with CONTRACTOR data	Required if detailed line item data is submitted in monthly batch file.	GT_HRWYE_PRIOR_MONTH	130	139	10	NUMERIC(1)
	The Grand Total Contract Prior Month Planned Dollars Column (7b) reports planned costs for the prior month.			GT_COST_PLANNED_MONTH	140	152	13	CURRENCY (2)
Grand Total Cost Incurred ITD (7c)	The Grand Total Contract Cost Dollars Column 7c which represents Contract Cost Inception to Date	Submitted with CONTRACTOR data	Required . Does not require detailed line item data if provided from Cost Incurred Month (7a)	GT_ITD_COST	153	165	13	CURRENCY (2)
	Grand Total Contract Planned Cost Dollars Column (7d) which represents Planned Contract Cost Inception to Date			GT_COST_PLANNED_ITD	166	178	13	CURRENCY (2)
Grand Total Estimated Cost (8a)	The Grand Total Contract Estimated Cost for first upcoming month, or Current Month Estimate for cost.	Submitted with CONTRACTOR data	Required	GT_EST_COST	179	191	13	CURRENCY (2)

CCR Extension Data Element	Description	Contractor Initial Data Mapping	533 Required/ Optional	Field Name	St Pos	End Pos	Len	Format
Grand Total HR/WYE (8a)	The Grand Total Contract Estimated Hours for first upcoming month, or Current Month Estimate for HR/WYE.	Submitted with CONTRACTOR data	Required if detailed line item data is provided for this column	GT_HRWYE_FIRST_MONT H	192	201	10	NUMERIC (1)
Grand Total Next Month Estimated Cost (8b)	The Grand Total Contract Estimated Cost for second upcoming month or Next Month Estimate for cost.	Submitted with CONTRACTOR data	Required if detailed line item data is provided for this column	GT_NEXT_MONTH_EST	202	214	13	CURRENCY (2)
	Grand Total Balance of Contract for the remaining estimate to complete			GT_BALANCE_CONTRACT	215	227	13	CURRENCY (2)
	Grand Total Contractor Estimate for the total estimate to complete entire scope of contract			GT_BALANCE_CONTRACTOR_ESTIMATE	228	240	13	CURRENCY (2)
	Grand Total Contract Value based upon Contract Modifications			GT_CONTRACT_VALUE	241	253	13	CURRENCY (2)
	Grand Total Unfilled Orders Outstanding at end of reporting period			ST_UNFILLED_ORDERS	254	266	13	CURRENCY (2)

Detail (Repeating Segment)

CCR Extension Data Element	Description	Contractor Initial Data Mapping	533 Required/ Optional	Field Name	St Pos	End Pos	Len	Format
CCR DETAIL LINE ITEMS:								
Record Type	'DM' for Monthly column 7a Detail; 'DQ' for ITD Column 7c Detail	"RD" for Detail	Required	RECORD_TYPE	1	2	2	CHAR
Reporting Category	Reporting Category	Line item field—submitted with CONTRACTOR data	Required	SERV_ORD_CAT	3	26	24	CHAR
Cost Incurred Month (7a)	Prior Month incurred costs (ACTUALS) for given category.	Line item field—submitted with CONTRACTOR data	Required if detailed line item data is not provided from Cost Incurred Month (7c)	COST_INCUR_MONTH	27	39	13	CURRENCY (2)
HR/WYE Incurred Month (7a)	Prior month incurred hours worked [Actuals] for given category.	Line item field—submitted with CONTRACTOR data	Optional unless Required by contract for WYE calculation	HRWYE_INCUR_MONTH	40	49	10	NUMERIC (1)
	Contract Prior Month Planned Dollars Column (7b) reports planned costs for the prior month			COST_PLANNED_MONTH	50	62	13	CURRENCY (2)
	Contract Cost Dollars Column (7c) which represents Contract Cost Inception to Date			CUR_COST_INCUR_ITD	63	75	13	CURRENCY (2)
	Contract Planned Cost Dollars Column (7d) which represents Planned Contract Cost Inception to Date			COST_PLANNED_ITD	76	88	13	CURRENCY (2)
Current Month Estimate Cost (8a)	Estimated costs for first upcoming month for given category.	Line item field—submitted with CONTRACTOR data	Required.	CUR_MONTH_EC	89	101	13	CURRENCY (2)
HRWYE Current Month	Estimated hours for first upcoming month for given category. Will only be needed if labor hours are required to be	Line item field—submitted with CONTRACTOR	Optional unless Required by contract for WYE	HRWYE_CUR_MONTH_EST	102	111	10	NUMERIC (1)

CCR Extension Data Element	Description	Contractor Initial Data Mapping	533 Required/ Optional	Field Name	St Pos	End Pos	Len	Format
Estimate (8a)	submitted electronically per contract.	data	calculation					
Next Month Estimated Cost (8b)	Estimated costs for second upcoming month for given category.	Line item field—submitted with CONTRACTOR data	Required unless not part of Contract scope	NEXT_MONTH_EC	112	124	13	CURRENCY (2)
	Balance of Contract for the remaining estimate to complete (8c)			BALANCE_CONTRACT	125	137	13	CURRENCY (2)
	Contractor Estimate for the total estimate to complete entire scope of contract (9a)			CONTRACTOR_ESTIMATE	138	150	13	CURRENCY (2)
	Contract Value based upon Contract Modifications			CONTRACT_VALUE	151	163	13	CURRENCY (2)
	Unfilled Orders Outstanding at end of reporting period			UNFILLED_ORDERS	164	176	13	CURRENCY (2)
	Used by SAP to determine Reporting Category Level (1.1.2.2.1)			REPORTING_LEVEL	177	206	30	CHAR
	Fill in an "X" if record is a Reporting Category. Otherwise, leave blank for Sub-Reporting Category Line Items and Element of Cost detail records. This field is used by SAP to determine if the record is a Reporting Category.			REPORTING_CAT_INDICATOR	207	207	1	CHAR

Trailer (provides the number of header & detail records sent from the contractor/vendor/center in order to verify the receipt of complete data after transmission)

CCR Extension Data Element	Description	Contractor Initial Data Mapping	533 Required/ Optional	Field Name	Start Pos	End Pos	Length	Format
TRAILER :								
Record Type	Used by eGate to determine record type	"TL" for Trailer	Required	RECORD_TYPE	1	2	2	CHAR
Record Count	Count of the number of Detail records sent to process (Detail Only)	Trailer field submitted with CONTRACTOR data	Required	RECORD_COUNT	3	9	7	NUMERIC
	Value of spaces			FILLER	10	207	198	CHAR

Remarks: N/A

Maintenance:

The Contractor shall provide a revised NF533M immediately to correct errors when deemed necessary by the Office of the Chief Financial Officer. The revised NF533M shall be delivered prior to the JSC cost processing closure for the month.

1. DRD Title: Organizational Conflicts of Interest (OCI) Plan		
2. DRD No.: USDV-10	3. Data Type: 1	4. OPR: BG
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input checked="" type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The plan will communicate the contractor's approach to identify and resolve OCIs. The contractor will be held accountable for identifying, dispositioning, and reporting OCIs during contract performance.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR ON/USDV Lead Initial Submission: Initial - Provide with Proposal. Additional Submissions: Final due 30 calendar days post contract start. Submission Frequency: After initial approval - the plan shall be reviewed annually by Sept 30th and submitted if updates are required to reflect changes to the plan. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this. Update when contractor teaming arrangements change and when new or potential OCI issues occur. Respond to CO with each Task Order Proposal whether update to the plan is required. Updated when requested by CO. Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment. Interrelationship: SOW: 2.2.2 <i>Business Other</i> ; DRD: USDV-1 Clause H.2 NFS 1852.209-71, <i>Limitation of Future Contracting. (Dec 1988)</i> , Clause I.1.II NFS 1852.237-72, <i>Access to Sensitive Information</i> , Clause I.1.II NFS 1852.237-73, <i>Release of Sensitive Information</i> . Applicable Documents: FAR Subpart 9.5, <i>Organizational and Consultant Conflicts of</i>		

Interest, NFS 1809.500, Organizational and Consultant Conflicts of Interest

Scope: The OCI Plan describes the contractor's comprehensive approach to identify, avoid, mitigate, neutralize, and report potential OCI issues, including conflicts described in the solicitation and those discovered during contract performance.

Contents: The Organizational Conflicts of Interest (OCI) Plan shall meet the requirements of FAR Subpart 9.5, *Organizational and Consultant Conflicts of Interest* and include the following:

- a. Point of contact for OCI issues and reports.
- b. Demonstrate an understanding of (1) OCI principles and (2) the full breadth of OCI issues and the types of harm that can result. The Plan at a minimum addresses the three primary types of OCIs (i.e., biased ground rules, unequal access to information, and impaired objectivity).
- c. Define company roles, responsibilities, and procedures for (1) screening (i.e., identifying/recognizing, analyzing/evaluating, resolving, and reporting) existing and new business opportunities for actual/potential OCIs and (2) monitoring and reporting all potential/actual OCIs that arise, resolving conflicts, and reporting previously unidentified OCIs or potential OCIs to the Government.
- d. Describe how employees are notified of the Plan's requirements and how this notification will be documented. Describe the training to be provided to Contractor and subcontractor personnel regarding potential OCIs on this contract. Establish and require entrance training for new employees, refresher training for existing employees, and exit training for departing employees. Describe how completion of this training will be documented, including a copy of any training certification template that the contractor will use to document that its employees have completed training.
- e. Describe how the contractor will report breaches of the protective measures in the Plan to the Contracting CO. Describe what processes the contractor will implement following any breach and indicate that final resolution of the corrective action must be approved by the CO.
- f. Identify any affiliated companies/entities (e.g., a parent company or a wholly owned subsidiary) and procedures for coordinating OCIs with such affiliated companies/entities.
- g. Address the process for reporting all potential/actual OCIs that arise during performance of the contract to the CO. An OCI report shall include:
 1. a description of the conflict,
 2. the plan for resolving the conflict, and
 3. the benefits/risks to contract performance associated with plan approval/acceptance.
- h. Specific resolution strategies shall be appended to the Plan upon approval by the CO.

- i. Explain how the contractor will flow down the provisions of this Plan to any subcontractor that may have a conflict with regard to performing the requirements of this contract. Discuss affected subcontractors' OCI program as it relates to this contract and specifically explain how affected subcontractors will identify, resolve, and report actual/potential OCIs associated with this contract.
- j. Define organizational and employee sanctions for violations of established OCI procedures/requirements/guidelines.
- k. Include an assertion from the Contractor that to the best of their knowledge no OCIs exist currently, if applicable. Provide a list of all the prime's and subcontractor's NASA contracts and subcontracts and description of the work performed, which would provide the CO a better understanding of other NASA work performed by the Offeror that may give rise to an actual or potential conflict.
- l. Include a requirement to update this plan as necessary to address specific OCIs. All updates to the plan must be approved by the CO and the updates/changes must be incorporated in the contract to be effective.
- m. Require periodic self-audits to ensure compliance with established OCI procedures/requirements/guidelines.
- n. Define records related to the OCI plan (e.g., training and audit records) that will be made available to the Government upon request.
- o. Contractor's Describe the procedures the Contractor will use if needed to identify and partition Contractor personnel requiring access to or participation in activities that would otherwise create an OCI issue.
- p. In an appendix to the OCI Plan, identify the strategy (e.g., avoid, neutralize, mitigation, limitation on future contracting, etc.) for resolving each OCI risk or issue, due to the Contractor's relationships or potential relationships with the Government, other companies, and other contracts. that is either identified in the solicitation or created by the requirements of the solicitation/contract and explain the effect of such strategy on performance of the contract. If using a firewall, explain how these actions will operate to successfully address the conflict without adversely affecting performance of the contract. (Note: Specific plans to limit future competition are reflected in Clause H.2 NFS 1852.209-71, *Limitation of Future Contracting*. (Dec 1988)). Additionally, Contractor shall identify any potential OCIs created by the requirements of this Request for Proposal (RFP), which the Contractor intended to resolve using methods other than mitigation.

Note: The OCI Plan as outlined above is not for the purpose of addressing other very important contractual obligations such as:

- a. the contractor's obligation to protect sensitive information in accordance with Clause I.1.II NFS 1852.237-72, *Access to Sensitive Information*,
- b. the contractor's obligation to conduct business in an ethical manner in accordance with Clause I.1.I FAR 52.203-13, *Contractor Code of Business Ethics and Conduct*, and

Reference: NFS 1809.500, *NASA Guide on Organizational Conflicts of Interest (March 2010)*

Remarks: The final plan, as approved, shall be incorporated in the contract as Attachment J-10, *Organizational Conflicts of Interest (OCI) Plan*.

Maintenance: Revisions are subject to CO approval.

DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Small Business Subcontracting Plan and Reports		
2. DRD No.: USDV-11	3. Data Type: 1	4. OPR: Office of Small Business Programs (BA)
5. Solicitation No.: 80JSC023R0003	6. Contract No.: 80JSC024CA002	
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input checked="" type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: To describe the Contractor's planned approach to Small Business Subcontracting and their reporting against this plan.		
<p>11. Distribution:</p> <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO and CS OA/COR and Alternate COR BC/Contractor Industrial Relations Officer</p> <p>Initial Submission: Initial - Submit with Proposal</p> <p>Additional Submissions: Update as required to reflect changes that affect Subcontracting implementation</p> <p>Submission Frequency:</p> <p>a. Subcontracting Plan:</p> <ol style="list-style-type: none"> 1. Initial – Due with the proposal. 2. Approval – Prior to contract award. 3. Frequency –To be updated in accordance with FAR 19.702, <i>STATUTORY REQUIREMENTS</i> <p>b. Reports:</p> <ol style="list-style-type: none"> 1. All reports shall be submitted in accordance with Clause I.1.I FAR 52.219-9, <i>SMALL BUSINESS SUBCONTRACTING PLAN ALTERNATE II NOV 2016</i> and Clause I.1.II NFS 1852.219-75, <i>INDIVIDUAL SUBCONTRACTING REPORTS</i>. 2. The contractor shall submit semi-annually and at contract completion to the NASA/JSC CO Individual Subcontract Report and Summary Reporting, using the electronically version of this data. 		

3. Contractors are required to submit subcontracting data in the Electronic Subcontracting Reporting System (eSRS).
4. All contractors are required to register and file both types of subcontracting reports using the eSRS system. The website to register is www.esrs.gov.

Format: The Contractor's format is acceptable for the plan and shall be in accordance with Data Format section at the beginning of this attachment.; reporting shall be in compliance with Clause I.1.II NFS 1852.219-75, *INDIVIDUAL SUBCONTRACTING REPORTS*.

Interrelationship: SOW: 2.2.2 *Business Other*; DRD: USDV-7, USDV-8; FAR 19.702, *STATUTORY REQUIREMENTS*, Clause I.1.I FAR 52.219-8, *UTILIZATION OF SMALL BUSINESS CONCERNS*, Clause I.1.I FAR 52.219-9, *SMALL BUSINESS SUBCONTRACTING PLAN ALTERNATE II NOV 2016*, Clause I.1.II NFS 1852.219-75, *INDIVIDUAL SUBCONTRACTING REPORTS*

Applicable Documents: FAR 19.702, Statutory requirements, FAR 52.219-8, Utilization of Small Business Concerns, FAR 52.219-9, Small Business Subcontracting Plan Alt. II, NFS 1852.219-75, Individual Subcontracting Reports

Scope: The *Small Business Subcontracting Plan* shall be in compliance with Clause I.1.I FAR 52.219-9, *SMALL BUSINESS SUBCONTRACTING PLAN (OCT 2022) ALTERNATE II (NOV 2016)*.

The *Small Business Subcontracting Reporting* shall be in compliance with Clause I.1.II NFS 1852.219-75, *INDIVIDUAL SUBCONTRACTING REPORTS*.

Contents:

Plan:

- a. The Subcontracting plan must include all elements in paragraph (d) of FAR 52.219-9, Small Business Subcontracting Plan OCT 2022, Alternate II NOV 2016.
- b. The plan must include the approach that the Contractor intends to use to meet their proposed subcontracting goals. Subcontractors whose bid is part of this proposal shall be identified. For each subcontractor, the percentage of the proposal and any small or small business subcategory classification shall be identified.
- c. For areas of potential future subcontracting, the plan shall identify the area of work, the percentage of contract that this is expected to encompass, potential subcontractors and their small business or small business subcategory classification.
- d. Describe the management approach to subcontracting with small, small disadvantaged 8(a), Women-owned, HUBZone, Veteran owned, and Service-disabled veteran owned companies and HBCU/MIs.
- e. The Plan shall document the methodology behind determining their offerors proposed

goals, and the approach to consistently meet the offerors proposed goals through the duration of the USDV contract

- f. The Plan shall describe the efforts made to establish a goal for each small business category and what ongoing efforts, if any, the proposed plans during performance to increase participation in that category.
- g. If the subcontractor(s) is known, the plan must connect the work to the subcontractor and specify the extent of commitment to use the subcontractor (s) (enforceable vs. non-enforceable commitments). Small Business primes shall provide this information to the extent subcontracting opportunities exist in their approach to performing the USDV contract requirements.
- h. The Plan shall identify any work to be subcontracted that is considered “high technology.” High Technology is defined as research and development efforts that are within or advance the state-of-the-art in technology discipline and are performed primarily by engineers, scientists, and highly skilled and trained technicians or specialists.
- i. The requirements in the Plan must flow down to first tier large business subcontracts expected to exceed \$750,000. Although these first-tier large business subcontractors are encouraged to meet or exceed the stated goals, it is recognized that the subcontracting opportunities available to these subcontractors may differ from those suggested in the solicitation based upon the nature of their respective performance requirements.
- j. All plans shall provide information demonstrating the extent of commitment to utilize small business concerns and to support their development. Information provided should include a brief description of established or planned procedures and organizational structure for Small Business outreach, assistance, participation in the Mentor Protégé program, counseling, market research and Small Business identification, and relevant purchasing procedures. For Other than Small Business Offerors (Large Business), this information shall conform to applicable portions of the submitted Small Business Subcontracting Plan. Small Business primes shall provide this information to the extent subcontracting opportunities exist in their approach to performing the USDV contract requirements.
- k. Small Business are not required to submit Small Business Subcontracting Plans; however, Small Business primes shall indicate the amount of effort proposed to be done by a small business either at the prime level or at the first-tier subcontract level.
- l. The plan shall include the Small Business Subcontracting Tables DRD USDV-11-01 and DRD USDV-11-03 below, which provides a breakdown of the Offeror’s proposed goals, by small business category, expressed in terms of both a percent of TOTAL CONTRACT VALUE and a percent of TOTAL PLANNED SUBCONTRACTS. Offerors shall modify these tables to show the proposed subcontracting goals for the

basic contract requirement (Core and IDIQ during base contract period of performance) and each option (IDIQ during each option year and Option CLIN2A) separately. In addition, the plan shall show the proposed phased approach by contract year to meet the overall contract total small business goals by end of the contract (separate tables for basic contract requirement and all options shown separately). This shall be expressed in terms of small business percentage goals by category and planned dollars spent by the end of each contract year (total dollars spent at contract level and total dollars spent by each small business categories). This shall be consistent with the proposed technical and schedule approach.

Listed in Table DRD USDV-11-02 below is an example of Subcontracting Goals, expressed in both contract value and subcontract value, for a contract proposed at \$100M with estimated subcontracts of \$50M.

TABLE DRD USDV-11-01: PROPOSED GOALS AS PERCENT OF CONTRACT VALUE AND AS PERCENT OF SUBCONTRACTING

	Column A	Column B	Column C
Business Category	Goal as Percent of Total Contract Value	Dollar Value to be subcontracted per Category	Goal as Percent of Subcontracting Value
Small Business Concerns			
Large Business Concerns			
Total Dollars to be Subcontracted			
Subcategories of Small Business Concerns			
Women Owned Small Business			
Small Disadvantaged Business			
Veteran Owned Small Business			
Service-Disabled Veteran-Owned Small Business			
HUBZone Small Business			
Historically Black Colleges and Universities and Other Minority Institutions (HBCU/MI)			

**TABLE DRD USDV-11-02 EXAMPLE CONTRACT PROPOSED AT \$100M
WITH ESTIMATED SUBCONTRACTS OF \$50M**

	Column A	Column B	Column C
Business Category	Goal as Percent of Total Contract Value	Dollar Value to be subcontracted per Category	Goal as Percent of Subcontracting Value
Small Business Concerns	25 percent	\$25,000,000	50 percent
Large Business Concerns	n/a	\$25,000,000	50 percent
Total Dollars to be Subcontracted	n/a	\$50,000,000	100 percent
Subcategories of Small Business Concerns			
Women Owned Small Business	9 percent	\$9,000,000	18 percent
Small Disadvantaged Business	5.5 percent	\$5,500,000	11 percent
Veteran Owned Small Business	2.5 percent	\$2,500,000	5 percent
Service-Disabled Veteran-Owned Small Business	1.5 percent	\$1,500,000	3 percent
HUBZone Small Business	1.5 percent	\$1,500,000	3 percent
Historically Black Colleges and Universities and Other Minority Institutions (HBCU/MI)	1.5 percent	\$1,500,000	3 percent

Shall be 100% if any dollars are subcontracted. **The small business subcategories do not necessarily add up to the percentage and dollar amount in the "Small Business Concerns" category above, since some small businesses do not fall into any of the subcategories below, while others will fall into more than one subcategory below. It is recommended that Offerors first complete Column B by entering the dollar amount the Offeror proposes to subcontract to each business category and subcategory. To complete Column A, divide the dollar amount in Column B by the total offered price of the proposal (that is, total contract value). In the example above, Column A for Veteran Owned Small Business = \$2,500,000 divided by \$100,000,000, or 2.5%. To complete column C, divide the corresponding amount in Column B by the amount in the "Total Dollars to be Subcontracted" cell in Column B. In the example above, Column C for Veteran Owned Small Business = \$2,500,000 divided by \$50,000,000, or 5%.

TABLE DRD USDV-11-03: LIST OF SMALL BUSINESS SUBCONTRACTORS

Company Name	UEI/Cage Code	Type of Business	NAICS	SOW Ref.	Dollar Value
Total					

TABLE DRD USDV-11-04: EXAMPLE SMALL BUSINESS SUBCONTRACTORS

Company Name	UEI/Cage Code	Type of Business	NAICS	SOW Ref.	Dollar Value
XYZ Corp	123456789	SB, SDB	811212	3.2	\$400,000
Acme Ltd.	5WKH50	Large	541579	2.1	\$1,520,000
Smith and Jones		VOSB, SDVOSB	541512	2.4	\$4,650,000
Total					\$6,570,000

Reports (Large business primes only): All reports shall be developed and submitted in accordance with Clause I.1.I FAR 52.219-9, *SMALL BUSINESS SUBCONTRACTING PLAN ALTERNATE II NOV 2016* and Clause I.1.II NFS 1852.219-75, *INDIVIDUAL SUBCONTRACTING REPORTS*.

Remarks: The final plan, as approved, shall be incorporated in the contract as Attachment J-11, *Small Business Subcontracting Plan*. All changes to this plan must be coordinated and approved by the NASA Contracting Officer and Office of Small Business Programs prior to the updated plan being resubmitted as a DRD deliverable into the Program Authorized Library (EDMS or Equivalent).

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Diversity, Equity, Inclusion, and Accessibility (DEIA) Plan		
2. DRD No.: USDV-12	3. Data Type: 3	4. OPR: BG
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input checked="" type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The DEIA plan demonstrates the contractor's commitment to fairness regarding diversity, equity, inclusion, and accessibility. This plan will provide NASA with an understanding of how the contractor plans to recruit, retain, and develop a diverse high performing workforce from underserved communities. The plan shall include measurable performance metrics and objectives. The DEIA plan will be utilized as an assessment tool by the CO to monitor the contractor's progression in its commitment to diversifying its workforce.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR Initial Submission: Plan shall be submitted within 30 working days after contract award. Additional Submissions: N/A Submission Frequency: After initial approval - the plan shall be reviewed annually by Sept 30th and submitted to reflect changes to the plan with performance metrics and objectives from current or most recent organizational reporting period. Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment. Interrelationship: SOW: 2.2.2 <i>Business Other</i> Applicable Documents: Executive Order 13985, <i>Advancing Racial Equity and Support for Underserved Communities Through the Federal Government</i> Scope: In support of the Executive Order 13985, <i>Advancing Racial Equity and Support for Underserved Communities Through the Federal Government</i> , NASA is seeking to advance equity or remove barriers for members of underserved communities to access procurement opportunities. Underserved communities refer to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life. Underserved		

Communities include Black, Latino, Indigenous, Native American, Asian Americans and Pacific Islanders, and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality.

Contents: The Diversity, Equity, Inclusion, and Accessibility (DEIA) Plan shall identify qualitative and quantitative approaches utilized to measure progress in the areas of Leadership and Commitment, Diverse Talent, and Culture and Sustainability. The plan shall include measurable performance metrics and objectives.

The Contractor shall address the following annually:

Leadership and Commitment – Demonstrate leadership’s commitment and accountability to diversity, equity, and inclusion. Identify quantitative approaches utilized to measure progress of a Diversity and Inclusion program

1. What is the operational status of, and level of resources available to, offices or divisions within the organization that are responsible for advancing civil rights or whose mandates specifically include serving underrepresented or disadvantaged communities?
2. What actions has the organization taken to implement affirmative equity-enhancing policies, regulations, guidance, and approaches to emphasizing equity in policy- and rule-making processes?
3. Describe how the organization’s commitment will be communicated internally and externally from leadership to employees and stakeholders.

Diverse Talent – Demonstrate the pursuit of a high performing diverse workforce from underserved communities.

1. Discuss the specific diversity metrics utilized by the organization to measure performance in achieving a diverse workforce. Provide the corresponding metrics for the current or most recent organizational reporting period.
2. What barriers or opportunities exist to engage subject matter experts from underserved communities in industry and academia? How does the organization plan to overcome those barriers?
3. How will underserved communities be leveraged?
4. Describe recruiting activities, objectives, and outcomes (e.g., number of participants, number interviewed and hired from underserved communities) for the current or most recent organizational reporting period.

Culture & Sustainability – Demonstrate how an inclusive and fair work environment will be cultivated and maintained.

1. Based on the data, what structures and strategies will be used to manage diversity, measure results, refine approaches, and institutionalize a culture of inclusion? Identify actionable opportunities to improve data collection, use, and sharing that allows for disaggregation, the ability to deliver products and services more equitably,

and better understanding of how programmatic and policy decisions impact underserved communities.

2. Describe other corporate activities that seek to increase support of diversity, equity, and inclusion in the current or most recent organizational reporting period.

Remarks: The final plan, as approved, shall be incorporated in the contract as Attachment J-12, *Diversity, Equity, Inclusion, and Accessibility (DEIA) Plan*.

Maintenance: Changes shall be incorporated by change page or complete reissue.

1. DRD Title: Configuration Management (CM) Plan		
2. DRD No.: USDV-13	3. Data Type: 1	4. OPR: OH
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input checked="" type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: This plan shall describe the assignment of responsibility organizationally and the procedures used in the accomplishment of the specific CM requirements, processes, and procedures, as stated in the SOW and SSP 41170, <i>Configuration Management Requirements</i> .		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OH/ISS Configuration Management Office ON/USDV Lead Initial Submission: Initial at MCR Additional Submissions: Final at SRR Submission Frequency: The plan shall be reviewed annually for currency and submitted by Sept. 30 th if updates are required to reflect changes to the plan. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this. Update as required to reflect changes that affect CM implementation. Format: Microsoft Word Interrelationship: SOW: 2.3 <i>Configuration Management</i> , 3.6 <i>Mission Concept Review (MCR)</i> , 3.7 <i>System Requirements Review (SRR)</i> ; DRD: USDV-3 Applicable Documents: SSP 41170, <i>Configuration Management Requirements</i> Scope: This CM plan defines the requirements, responsibilities, and processes and procedures for the Contractor's CM system pursuant to SSP 41170, <i>Configuration Management Requirements</i> , and as it applies to this contract. Contents: The Configuration Management (CM) plan shall address, at a minimum, the following:		

- a. Management Organization
 1. Responsibility and authority for CM including roles in configuration control boards and technical reviews.
 2. Interfaces between contractor's CM organization and NASA, subcontractors, and other contractor's/contracts.
- b. Configuration Identification
 1. Selection of Configuration Items (CIs) (Hardware, Computer Software Configuration Items [CSCIs], and firmware).
 2. Establishment of the functional, allocated and product baselines for hardware and software.
 3. Assignment and application of configuration identifiers including serial numbers, part numbers, lot codes, software, and firmware identifiers.
- c. Configuration Control
 1. Establishment of internal configuration and contractual baselines.
 2. Implementation of internal configuration control.
 3. Establishment of configuration control boards and processes.
 4. Identification of processes to control changes, deviations, and waivers to program baselines.
- d. Configuration Status Accounting
 1. Hardware/Software Configuration Status Accounting processes and provisions for reports and/or access to Configuration Status Accounting data.
 2. Description and methods of processes and tools to provide:
 - i. Identification of current approved configuration documentation and configuration identifiers associated with each CI.
 - ii. Status of proposed engineering changes from initiation to implementation.
 - iii. Waiver/deviation status and processing.
 - iv. Results of configuration audits; status and disposition of discrepancies.
 - v. Traceability of changes and confirmation of change incorporation.
 - vi. Methods of access to information.
 3. Retention of historical data.
 4. Systems and tools (including data elements).
- e. Configuration Verification/Audits
 1. Audit conduct, policies, procedures, documentation, access, and support.
 2. Processes, plans, schedules for internal CM audits and subcontractor CM

audits.

f. Data Management

1. Development, approval, release, and submittal of configuration data/documentation (including drawings) in relation to program and contractual events (DRDs, technical reviews, Acceptance Reviews, Certification of Flight Readiness, etc.).
2. Plan for subcontractor data management deliveries/control access.
3. Establishment and operation of Engineering Release Unit and CM receipt desk.
4. Process for Documentation control (i.e., Document Change Notices).
5. Retention of historical data.
6. Systems and tools.

g. Requirements and Verification Management

1. Description of how CM hardware requirements and verification will be managed.
2. Approach for documenting verification approvals from NASA.
3. Approach for delivering acceptance data packages to NASA.

h. Engineering Drawing Management:

1. Description of any institutional Computer-Aided Design (CAD) modeling, schematic generation, and drawing systems, and/or
2. Description of how CAD models, schematics, and drawings are to be reviewed and released; revised; number assignment and control.

The CM Plan shall describe in relation to the elements above the Contractor's CM organization, policies, procedures, implementation approach, and control systems that are to be used to ensure proper performance of all CM activities. The CM plan shall also describe the configuration management activities, processes, and systems to be employed to support the NASA change evaluation and control process for the approval of program requirements, as well as for the submission of Waivers, Deviations, Exceptions, or Variances.

Remarks: The final plan, as approved, shall be incorporated in the contract as Attachment J-13, *Configuration Management Plan*

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Information Technology Security Management Plan (ITSMP)		
2. DRD No.: USDV-14	3. Data Type: 1	4. OPR: OH
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input checked="" type="checkbox"/> Administrative <input type="checkbox"/> S&MA
<p>10. Description/Use: To provide Government insight into the Contractor's methodology for managing all aspects of information security and to ensure critical components are addressed. The ITSMP will be in compliance with Clause I.22 NFS 1852.204-76, <i>SECURITY REQUIREMENTS FOR UNCLASSIFIED INFORMATION TECHNOLOGY RESOURCES (APR 2021) (DEVIATION)</i>. The Government, after review of the ITSMP, will notify the Contractor of the need for an IT Security Plan (ITSP) and the associated due date.</p>		
<p>11. Distribution:</p> <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OH/ISS IT Office</p> <p>Initial Submission: Initial ITSMP - 30 working days after Contract Start</p> <p>Additional Submissions: Per Submission Frequency below.</p> <p>Submission Frequency: ITSMP</p> <ul style="list-style-type: none"> ▪ Initial: 30 calendar days after contract start • Frequency of Submission: After initial approval - the plans and IT Proof of Concept (POCs) shall be reviewed annually by Sept 30th for updates as required to reflect changes to IT POCs and/or plans, processes, and baseline configuration of the system(s) stated in the DRD. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this. ▪ Additional Submissions: As requested by the Government ▪ Others as stated in this DRD. <p>ITSP (if required):</p> <ul style="list-style-type: none"> ▪ Initial: 30 calendar days after requested by NASA ▪ Frequency of Submission: After initial approval - the plans and IT POCs shall be reviewed annually by Sept 30th for updates are required to reflect changes to IT POCs and/or plans, processes, and baseline configuration of the system(s) stated in the DRD. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this. 		

- Additional Submissions: As requested by the Government

Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment

Interrelationship: SOW: 2.4 *Information Technology (IT)*;
 Clause I.22 NFS 1852.204-76, *SECURITY REQUIREMENTS FOR UNCLASSIFIED INFORMATION TECHNOLOGY RESOURCES (APR 2021) (DEVIATION)*;
 Clause H.1.II NFS 1852.223-75, *MAJOR BREACH OF SAFETY OR SECURITY*;
 Clause I.1.II NFS 1852.237-72, *ACCESS TO SENSITIVE INFORMATION*;
 Clause I.1.II NFS 1852.237-73, *RELEASE OF SENSITIVE INFORMATION*;
 Clause L.11 NFS 1852.239-73, *REVIEW OF THE OFFEROR'S INFORMATION TECHNOLOGY SYSTEMS SUPPLY CHAIN (DEVIATION 15-03D)*;
 Clause I.27 NFS *INFORMATION TECHNOLOGY SYSTEM SUPPLY CHAIN RISK ASSESSMENT (JAN 2020) (DEVIATION)*;
 Clause I.2 FAR 52.204-21: *BASIC SAFEGUARDING OF COVERED CONTRACTOR INFORMATION SYSTEMS. (NOV 2021)*

Applicable Documents:

NPR 2810.1(series), *NASA Information Security Policy*
 OMB Circular A-130, *Management of Federal Information Resources*

Scope: All contracts that purchase, lease, network to, or otherwise utilize Government-funded IT (as defined by the Clinger-Cohen Act of 1996 and referenced by Office of Management and Budget (OMB) Circular A-130 must comply with NASA IT Security Requirements

Contents:

Information Technology Security Management Plan (ITSMP):

The Contractor shall submit an ITSMP for its unclassified technology information resources. This plan shall describe the policy, processes, and procedures that will be followed to ensure appropriate security of Information Technology (IT) resources that are developed, processed, or used under this contact. The Contractor's ITSMP shall be compliant with the IT security requirements in accordance with Federal and NASA policies as referenced in OMB Circular A-130, *Managing Information as a Strategic Resource* and NPR 2810.1(series), *NASA Information Security Policy*.

The ITSMP shall include, at a minimum, the following:

- a. Contractor's information security Points of Contact, including roles and responsibilities.
- b. A description of policies, processes, and/or procedures for:
 1. Meeting all applicable security assessment & authorization requirements, including but not limited to development and maintenance of ITSPs, including external IT systems, implementation and validation of security controls, security assessment, authorization, and continuous monitoring in accordance

to NASA directives and guidance.

2. Addressing all applicable information security requirements, including vulnerability scanning and mitigation, maintaining secure operating system configuration, patch/configuration management, contingency planning, and protection of sensitive data in transit and at rest.
3. Information security, privacy, incident management and responses, including coordination with NASA Security Operations Center (SOC), Center Chief Information Security Officer (CISO), and Center Privacy Manager as required. The contractor shall immediately notify the NASA SOC, CO, and COR once an incident has been identified.
4. Ensure the Contractor employees meet information security requirements, such as information security awareness, rules of behavior, and elevated privilege training as required. Users are knowledgeable of NASA information security policies and procedures when handling NASA data.

c. IT Security Plan:

The Contractor shall have an Information Systems Security Officer who is responsible for the contractor's system(s) in accordance with the definitions set forth in NPR 2810.1(series), *NASA Information Security Policy*. The ITSP shall be kept up to date as changes to the baseline configuration of the system occur and shall be documented in the IT Security Plan.

Note: An ITSP is specific to a system or group of systems, while an ITSMP is defined as the elements a contractor has outlined to meet the IT Security requirements for interfacing with other contractors and NASA, training requirements and meeting the requirements in NPR 2810.1(series), NASA Information Security Policy.

d. IT Security Awareness Training:

1. Employees subject to this contract shall complete the NASA approved IT Security Awareness Training annually. The contractor shall provide evidence that periodic IT security awareness training has been met for all employees subject on this contract. The contractor shall submit periodic reports (as required by the CO) detailing the overall status of the annual training program. The annual training program is defined as the period from October 1st through September 30th.
2. The Contractor shall provide evidence that periodic IT security training has been met for all employees subject on this contract. Contractor-provided IT security awareness training may be substituted but must be approved annually by the Government (via the JSC CISO) as an acceptable substitute. The Contractor shall submit periodic reports (as required by the CO) detailing the overall status of the annual training program. The annual training program is defined as the period from October 1st through September 30th.

e. Information on Employees in Sensitive Positions/Assignments Report:

The Information on Employees is Sensitive. ITS Positions/Assignments Report shall provide information annually for personnel screening as required by NPR

2810.1(series), *NASA Information Security Policy*, and NPR 1600.1, *NASA Security Program Procedural Requirements* on position risk.

f. IT Point of Contact:

The contractor shall identify a point of contact that NASA may reach in its attempt to address IT and IT Security issues. The point of contact shall have the authority to ensure appropriate actions occur.

Remarks: The Government, after review of the ITSMP, will notify the Contractor of the need for an IT Security Plan (ITSP) and the associated due date. The ITSP will be in compliance with Clause I.22 NFS 1852.204-76, *SECURITY REQUIREMENTS FOR UNCLASSIFIED INFORMATION TECHNOLOGY RESOURCES (APR 2021) (DEVIATION)*.

The final IT Security Management Plan, as approved, shall be incorporated in the contract as Attachment J-14, *Information Technology Security Management Plan (ITSMP)*

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Export Control Plan		
2. DRD No.: USDV-15	3. Data Type: 2	4. OPR: OX
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input checked="" type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: Document the Contractor's approach for Export Control		
<p>11. Distribution:</p> <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OH/ISS Data Management ON/USDV Lead OX/ISS Export Control Lead</p> <p>Initial Submission: Initial – As requested by CO from all Offerors in the competitive range or only from the apparent successful Offeror. Offeror(s) will be notified by the Contracting Officer of this requirement, with an anticipated 10 calendar days allowed for submittal.</p> <p>Additional Submission: Final due 30 calendar days after contract award</p> <p>Submission Frequency: The plan shall be reviewed annually for currency and submitted by Oct. 15th if updates are required to reflect changes to the plan. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this</p> <p>Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment</p> <p>Interrelationship: SOW: 2.5 <i>Export Control Management</i>; DRD: N/A; Clause H.3 NFS 1852.225-70, <i>EXPORT LICENSES. (FEB 2000)</i></p> <p>Applicable Documents: NPR 2190.1, <i>NASA Export Control Program</i>; NPD 2190.1, <i>NASA Export Control Program</i>, NAII 2190.1, <i>NASA Advisory Implementing Instruction, NASA Export Control Program Operations Manual</i>; JWI 2190.1, <i>JSC Work Instruction, JSC Export Compliance</i>; JAII 2190.1, <i>JSC Advisory Implementing Instruction, Export Services Team (EST) Operations Manual</i></p>		

Scope: The plan shall describe export control activities related to performance of contract requirements.

Contents:

The Contractor shall prepare and submit an Export Control Plan (ECP), describing the Contractor's planned approach for accomplishing contract functions while adhering to export laws, regulations, and directives, including International Traffic in Arms Regulations (ITAR) and Export Administration Regulations (EAR). The plan shall include an explanation of expected exports, approval process and authorities used, and managing of foreign nationals in complying with export control laws.

The ECP shall address these elements of their export control program:

Element 1: MANAGEMENT COMMITMENT

Element 2: RISK ASSESSMENT

Element 3: EXPORT AUTHORIZATION

Element 4: RECORDKEEPING

Element 5: TRAINING

Element 6: AUDITS

Element 7: HANDLING EXPORT VIOLATIONS & TAKING CORRECTIVE
ACTIONS

Remarks: The final plan, as approved, shall be incorporated in the contract as Attachment J-15, *Export Control Plan*.

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Government Property Management Plan		
2. DRD No.: USDV-16	3. Data Type: 3	4. OPR: BG
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input checked="" type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: To describe the method of administering and controlling Government personal property and submitting proposed property manager qualifications.		
<p>11. Distribution:</p> <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's BG/ OA/COR and Alternate COR JB/Industrial Property Officer</p> <p>Initial Submission: Initial – As requested by CO from all Offerors in the competitive range or only from the apparent successful Offeror. Offeror(s) will be notified by the Contracting Officer of this requirement, with an anticipated 10 calendar days allowed for submittal.</p> <p>Detailed supplemental property procedures (separate from the Government Property Management Plan), within 60 calendar days after the contract start date.</p> <p>Additional Submissions: Final due 30 calendar days after contract award; additional updates as requested by CO.</p> <p>Submission Frequency: The plan shall be reviewed annually for currency and submitted by Sept 30th, if updates are required to reflect changes to the plan. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this.</p> <p>Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment</p> <p>Interrelationship: SOW: 2.2.2 <i>Business Other</i>; DRD: USDV-17</p> <p>Applicable Documents: Clause I.1.I FAR 52.245-1 <i>GOVERNMENT PROPERTY</i></p> <p>Scope: The Government Property Management Plan defines the Contractor's use, maintenance, repair, protection, and preservation of Government personal property. The Contractors submitting an initial Property Management Plan as part of their reply to the</p>		

Request for Proposal in accordance with Contracting Officer direction, shall also submit proposed property manager qualifications and experience as specified below.

Contents:

The plan shall describe the Contractor's approach to receiving, handling, stocking, maintaining, protecting, and issuing Government property (equipment and material).

The plan shall include interaction and Department/Office responsibilities.

The Contractor shall submit to the delegated Government Property Administrator (GPA) detailed supplemental property procedures, which are separate from the Property Management Plan, within 60 calendar days after the contract start date.

The Contractors submitting an initial Property Management Plan as part of their reply to the Request for Proposal in accordance with Contracting Officer direction, shall also submit proposed property manager qualifications and experience.

This plan shall reference those policies and procedures which are part of the Contractor's Property Management System and shall include at a minimum, but not limited to, the following functions/outcomes/activities:

- a. Property Management
 1. Voluntary consensus standards, industry-leading practices and standards, customary commercial practices
 2. Periodic internal reviews, surveillances, self-assessments, and audits
 3. Written procedures
- b. Acquisition of Property
 1. Acquisition authority
 2. Classification of property
- c. Receipt of Government Property
 1. Receiving
 2. Identification
- d. Records of Government Property
- e. Physical Inventory
- f. Subcontractor Control
 1. Flow down of property clauses to subcontractors
- g. Reports
 1. Loss, Theft, Damage, Destruction reports
 2. Physical Inventory reports
 3. Audits and self-assessment reports
 4. Corrective Action reports

- h. Relief of Stewardship Responsibility and Liability
 - 1. Loss, Theft, Damage, Destruction of property
 - 2. Consumed property
 - 3. Delivered property
 - 4. Contractor Inventory Disposal of property
 - i. In-house screening of excess
 - ii. Disclosure of excess
 - 5. Abandonment of Government property (if directed by the Government)
- i. Utilizing Government Property
 - 1. Utilization
 - 2. Consumption
 - i. Movement
 - ii. Storage
- j. Maintenance
 - 1. Preventive maintenance
 - 2. Rehabilitation
 - 3. Calibration
- k. Property Closeout
 - 1. Screening for further use
 - 2. Final physical inventory
 - 3. Transfers off the contract
 - 4. Final NASA Form 1018
- 1. Reconcile Contractor Records with NASA Financial Property Records [NASA Form 1018, *NASA Property in the Custody of Contractors* and the Contractor-Held Asset Tracking System (CHATS) if applicable]
- m. JSC-Unique Considerations (as they arise or known now)

Remarks: The plan shall be incorporated in the contract as Attachment J-16, *Government Property Management Plan*

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Financial Reporting Contractor-Held Property		
2. DRD No.: USDV-17	3. Data Type: 3	4. OPR: LF
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input checked="" type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: Report NASA Property in the Custody of Contractors on both a monthly and annual basis, as required		
<p>11. Distribution:</p> <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's O BG/O and CS OA/COR and Alternate COR JSC Industrial Property Officer ISS Chief Property Custodian</p> <p>Initial Submission: As required per Clause G.4 NFS 1852.245-73, <i>FINANCIAL REPORTING OF NASA PROPERTY IN THE CUSTODY OF CONTRACTORS. (JAN 2017)</i> and Contractor Held Asset Tracking System (CHATS) manual</p> <p>Additional Submissions: As required per Clause G.4 NFS 1852.245-73, <i>FINANCIAL REPORTING OF NASA PROPERTY IN THE CUSTODY OF CONTRACTORS. (JAN 2017)</i> and CHATS manual</p> <p>Submission Frequency: As required per Clause G.4 NFS 1852.245-73, <i>FINANCIAL REPORTING OF NASA PROPERTY IN THE CUSTODY OF CONTRACTORS. (JAN 2017)</i> and CHATS manual</p> <p>Format:</p> <p>a. Annual Property NF1018, <i>NASA Property in the Custody of Contractors</i> reports shall be submitted using the NF 1018 Electronic Submission System (NESS) or other format supplied by NASA.</p> <p>b. Monthly Property Financial Reports shall be submitted using the CHATS (https://chats.nasa.gov) using the format described in the CHATS user's manual.</p> <p>Interrelationship: SOW: 2.2.2 Business Other; DRD: USDV-16</p> <p>Applicable Documents: NFS Subpart 1845.71, Clause G.4 NFS 1852.245-73, <i>FINANCIAL REPORTING OF NASA PROPERTY IN THE CUSTODY OF CONTRACTORS. (JAN 2017)</i></p> <p>Scope: The NF1018, <i>NASA Property in the Custody of Contractors</i> report provides annual</p>		

summary-level property management and financial data on Government-furnished and contractor-acquired NASA property.

Content:

NF 1018 Reports

- a. The NF1018, *NASA Property in the Custody of Contractors* report provides annual summary-level property management and financial data on Government-furnished and contractor-acquired NASA property.
- b. The NF1018, *NASA Property in the Custody of Contractors* shall be completed in accordance with NFS Subpart 1845.71, Clause G.4 NFS 1852.245-73, *FINANCIAL REPORTING OF NASA PROPERTY IN THE CUSTODY OF CONTRACTORS. (JAN 2017)*, and any supplemental guidance provided by NASA.
- c. Contractors shall report all NASA-owned property in US dollars, regardless of location.
- d. Negative or zero reports are required.
- e. Adjustments to the NF1018, *NASA Property in the Custody of Contractors* shall be thoroughly explained in the NF1018, *NASA Property in the Custody of Contractors* "Comments" section and must be approved by the JSC Industrial Property Officer prior to submittal of the report, after first being coordinated with the cognizant Government Property Administration (GPA).
- f. Entries in Type of Deletion 21 "h. OTHER" must be explained in detail in the "Comments" section.
- g. Entries should not be placed in Type of Deletion 21 "d" or "e" since they should be reflected in "c".
- h. The NF1018, *NASA Property in the Custody of Contractors* report consists of two pages; a Summary first page and a Deletions second page. Both must be accurately completed for submittal.

Monthly Property Financial Reports

The Monthly Property Financial Reports shall be completed in accordance with the Contractor Held Asset Tracking System (CHATS) user's manual (<https://epss.nasa.gov/gm/folder-1.11.1123762?mode=EU&primaryCSH=chats>) and any supplemental guidance provided by NASA.

- a. The Contractor shall request that the JSC Contractor Held Property Accountant in LF3/Property, Cost, and Reporting Branch add contracts meeting the requirement for monthly property financial reporting to the CHATS. The contractor shall also request access to the CHATS via the NASA Account Management System (NAMS).
- b. Monthly Property Financial Reports are required with item level supporting data. This data shall be submitted for all items with an acquisition cost of \$500,000 or more, in the contractor's and its subcontractors' possession, in the following classifications: real property, equipment, special test equipment, special tooling, and agency peculiar

property (if applicable). Monthly reporting is not required for property in the above classifications with an acquisition cost under \$500,000. Monthly data shall also be submitted for items of any acquisition cost in the classifications of materials and contract work-in-process (WIP). Itemized monthly data is required for material line items of \$500,000 and over. Itemized monthly line item data is required for WIP. Summary monthly data is required for material items under \$500,000. Other software (not integrated into a piece of Government property that is necessary to operate that item) shall be considered an individual reporting item if the acquisition cost is \$1,000,000 or more and expected to have a useful life of 2 years or more.

- c. Acquisition costs shall be developed using actual costs to the greatest extent possible, especially costs directly related to fabrication such as labor and materials. Supporting documentation shall be maintained and available for all amounts reported, including any amounts developed using estimating techniques.

All Adjustments shall be thoroughly explained and directly related to a specific government fiscal year. If the government fiscal year cannot be determined, the default shall be the previous government fiscal year. Adjustments to the monthly report must be coordinated with JSC Finance.

Remarks: N/A

Maintenance:

Revisions to the NF 1018 NESS data shall be coordinated with the cognizant GPA.

Revisions to the Monthly Property Financial Reports shall be coordinated with the JSC Contractor Held Property Accountant in LF3/Property, Cost, and Reporting Branch.

1. DRD Title: Safety and Health Plan		
2. DRD No.: USDV-18	3. Data Type: 1	4. OPR: NS
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input type="checkbox"/> Administrative <input checked="" type="checkbox"/> S&MA
<p>10. Description/Use:</p> <p>A detailed Safety and Health Plan is submitted to show how the Contractor intends to protect the life, health, and well-being of the public, employees as well as property and equipment. The plan should include detailed discussions of the policies, procedures, and techniques for all anticipated working conditions that will be encountered throughout the performance of the contract.</p>		
<p>11. Distribution:</p> <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OE/ISS S&MA/Program Risk Office NS/Safety and Test Operations Division</p> <p>Initial Submission: Initial at Contract start + 30 calendar days. Upon NASA approval, the Contractor's Safety and Health Plan become a Contractual Requirement. Also see "Other Deliverables" below.</p> <p>Additional Submissions: As directed by the CO.</p> <p>Submission Frequency: Review and submit updates to the plan annually by Oct 1. Update the plan to meet the latest Occupational Safety and Health Administration (OSHA), JSC, and Voluntary Protection Program (VPP) requirements. Provide a copy of the updated plan with the changes highlighted to the distribution list above at the start of each Contract year. If no changes are required after the annual review, notify the individuals in the distribution list in writing to that affect as well as submit an EDMS Delivery Notice.</p> <p>Other Deliverables: The plan must include instructions for submitting the deliverables in Table 1 below to the Government and represent contractual commitments by the Contractor to provide this information. Include copies to the Contracting Officer and Contracting Officer's Representative.</p>		

Table USDV-18-1, SAFETY AND HEALTH PLAN DELIVERABLES			
Deliverable	Frequency	DRD Details Section Ref	Comments
Identity of key safety and health personnel: <ul style="list-style-type: none"> • Safety Representative 	Within 15 calendar days of contract start and updated with changes	1.2	Include in plan or attachment to plan
Safety Data Sheets (SDS)	When you introduce a new hazardous material onsite at JSC	1.3.a	Send to JSC Occupational Health See JPR 1700.1, Chapters 9.1 & 9.2
Hazardous Materials Inventory for hazardous materials used onsite at JSC	Yearly or when quantities or locations change significantly. Some products require quarterly updates	1.3.a	Send to JSC Occupational Health See JPR 1700.1, Chapter 9.2
On-site close calls submitted to JSC close call tracking system	Within 1 working day of receipt	2.2	Send to Safety and Test Operations Division
Mishap reporting	Immediate and follow-up as required in 2.3.1 below.	2.3.1	See also Chapter 2.6 of JPR 1700.1
Lessons Learned Report	Enter data into the JSC LLDB or NASA LLIS: <ul style="list-style-type: none"> • Within 30 calendar days of a triggering event. • Within 30 calendar days of a program milestone, mishap investigation, or hazard or other engineering analysis / evaluation is completed: or • 30 calendar days before end of contract evaluation 	2.3.1.1	Database entry with 1 electronic copy to the COR

	period or 45 calendar days before end of contract, whichever is applicable.		
JSC Form 288, “ <i>Statistical Information - Contractor Safety and Health Program</i> ”	Monthly by the 10th of the month. For onsite work and only if your employees work more than 1000 onsite hours in a quarter.	2.3.2	Send to JSC-Safety-Report-Submittals JSC-Safety-Report- [REDACTED]
Log of Occupational Injuries and Illnesses	Annually, within 45 calendar days of the calendar year being reported	2.3.3	Deliver to ISS Program Repository

Format: The Contractor’s format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment

Interrelationship: SOW: 2.11.7 *Safety and Health*; DRD: USDV-22

Applicable Documents:

JPR 1700.1, *JSC Safety and Health Requirements*

NPR 8621.1, *NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping*

OSHA CSP 03-01-005, *Voluntary Protection Program (VPP): Policies and Procedures Manual*

JPR 1040.4, *JSC Emergency Management Plan*

JPR 2310.1, *JSC Knowledge Management Strategy*

Scope: The contractor is part of a larger program – the NASA safety program – which has other contracted employees, civil servants, and other third parties that must be protected from any hazard in the workplace wherever they arise. This includes the following:

- Hazards associated with work done on contractual tasks.
- Hazards that arise from non-contractual operations in the vicinity of contractor’s workers.
- Hazards from contractual operations which may affect the safety and health of near-by individuals and assets.
- The plan must cover the prime contractor and all subcontractors.

The plan shall address all potential workplace hazards based on baseline contract work and anticipated task orders.

Contents: The requirements for this plan, as detailed in the instructions on plan content below, include instructions for specific reports and data to be submitted to the Government. These instructions are to be included in the plan and represent contractual commitments by the contractor to provide this information.

If the Contractor conducts work or will be located on a NASA site or in a NASA facility, the Safety and Health Plan shall discuss measures to be taken to ensure the protection of property, equipment, and the environment in the production of Contractor deliverables and/or in the pursuit of any of its activities.

The Safety and Health Plan shall contain the following information:

1.0 MANAGEMENT LEADERSHIP AND EMPLOYEE PARTICIPATION

Management and employees work together as a team to provide a safe and healthy workplace. Management and employee synergies often must work together across contractual lines.

- 1.1** Policy. Provide the Contractor's safety and health compliance policy statement with the plan. Compare the Contractor's policy statement with those of NASA and OSHA and discuss any differences.
- 1.2** Assignment of Responsibility. Identify by title a Company Safety Representative as, the individual who is be responsive to Center-wide safety, health and fire protection concerns and goals, and who participates in various joint meetings, forums, and other activities related to the JSC Safety and Health program.
- 1.3** Miscellaneous Deliverables. The Contractor shall acknowledge the following as standing requests of the Government and to be handled as described below.
 - 1.3.1** Material Safety Data Sheets/Safety Data Sheets (MSDS/SDS). Prepare and deliver MSDSs/SDSs for hazardous materials brought onto Government property or included in products delivered to the Government as required in chapters 9.1 and 9.2 of JPR 1700.1, *JSC Safety and Health Requirements*.
 - 1.3.2** Hazardous Materials Inventory. Compile and deliver an inventory report of all hazardous materials it has located on Government property quarterly as required by chapter 9.2 of JPR 1700.1, *JSC Safety and Health Requirements*, and which is within the scope of 29 CFR 1910.1200, *Hazard Communication*; and (or FED-STD-313) *Federal Standard 313, Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities*, as revised.

2.0 WORKSITE ANALYSIS

Worksite analysis identifies hazards and other safety and health threats to employees and valuable assets. As a minimum, analysis will include primarily the following: developing job hazard analyses for its employees; provisions to protect is employees from hazards in their work areas; inspections of the workplace; investigations of

mishaps and close calls; and the submission of safety and health data to the Government.

2.1 Analysis of Worksite Hazards. Describe how you will rank, process, and mitigate hazards that could result in USDV hardware damage or injury to USDV personnel and cause program delays. Describe techniques you use to accomplish this.

2.2 Employee Reports of Hazards - Identify methods to encourage employee participation in JSC's Close Call Reporting System to report observed hazardous conditions and events without fear of reprisal.

2.3 Accident and Record Analysis

2.3.1 Mishap Reporting and Investigation shall follow the NASA requirements levied in the Contractor's *Mishap Preparedness and Contingency Plan (DRD USDV-22)*.

2.3.1.1 Lessons Learned. Describe your approach to submitting Lessons Learned suitable for inclusion in the JSC Lessons Learned Database per JPR 2310.1, *JSC Knowledge Management Strategy*, and consistent with areas defined in the Statement of Work (SOW) or Work Breakdown Structure (WBS). Lessons learned are intended to prevent recurrence of undesirable events and to allow NASA and its team members to capitalize to the greatest extent practical on unique successes requiring documented insight for retrieval on demand.

2.3.2 Submit an Accident/Incident Summary Report **for onsite work if your employees work more than 1000 hours onsite at JSC in a quarter**. Submit the report on JSC Form 288, *Statistical Information - Contractor Safety and Health Program*, as revised. Negative reports that include exposure hours are also required.

2.3.3 Log of Occupational Injuries and Illnesses. For each location on or off NASA property that performs work on this contract, the Contractor shall deliver (under separate Contractor's cover letter), a copy of an annual summary of occupational injuries and illnesses (or equivalent) as described in 29 CFR Part 1904.32, Annual Summary. If Contractor is exempt by regulation from maintaining and publishing such logs, equivalent data in the Contractor's format is acceptable (such as loss runs from insurance carrier). This data shall be compiled and delivered each calendar year within 45 calendar days after the end of the year to be reported.

3.0 HAZARD PREVENTION AND CONTROL

Once hazards are identified, they must be eliminated or controlled to lessen the risk to personnel, facilities, and the work environment. This section builds on worksite analysis described in section 2.0 above.

- 3.1 Medical (Occupational Healthcare) Program. Discuss implementation of JSC's "Clinic First" policy when on site per JPR 1700.1, *JSC Safety and Health Requirements*, Chapter 3.6 for injuries occurring onsite at JSC.
- 3.2 Emergency Preparedness and response shall follow the Contractor's *Mishap and Preparedness and Contingency Plan (DRD USDV-22)*.
- 3.3 Test Safety. Describe your approach to safely supporting tests of the hardware onsite at JSC per chapter 6.8 of JPR 1700.1, *JSC Safety and Health Requirements*.

4.0 SAFETY AND HEALTH TRAINING

Discuss safety and health training. Employees (including management and supervisors) must be trained in the responsibilities to protect themselves and the facilities and operations in which they work. The results of worksite analyses and hazard prevention and control feed the resulting training programs. Timely feedback from trainees is critical to ongoing improvement of training material and course content.

Remarks: The final plan, as approved, shall be incorporated in the contract as Attachment J-17, *Safety and Health Plan*

Maintenance: Review the plan annually or as directed by the NASA CO. Update the plan to meet the latest OSHA, JSC, and VPP requirements. Provide a copy of the updated plan with the changes highlighted to the distribution list above at the start of each Contract year. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this and notify the individuals in the distribution list to that affect.

DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Risk Management Plan (RMP)		
2. DRD No.: USDV-19	3. Data Type: 2	4. OPR: OE
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input type="checkbox"/> Administrative <input checked="" type="checkbox"/> S&MA
10. Description/Use: Provides a baseline document for planning, management, control, and implementation of the Contractor's risk management system.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR ON/USDV Lead OE/ISS Safety and Mission Assurance/Program Risk Office Initial Submission: Initial at MCR Additional Submissions: Final at SRR Submission Frequency: The plan shall be reviewed annually for currency and submitted by Sept 30 th , if updates are required to reflect changes to the plan. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this. Updates as required to reflect changes that affect RMP implementation. Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment Interrelationship: SOW: 2.12 <i>Risk Management</i> , 3.6 <i>Mission Concept Review (MCR)</i> , 3.7 <i>System Requirements Review (SRR)</i> ; DRD: USDV-1, USDV-2, USDV-3, USDV-7 Applicable Documents: SSP 50175, <i>ISS Risk Management Plan</i> Scope: The RMP defines the detailed process on how the Contractor identifies risks early in the project so that appropriate plans can be implemented to reduce the consequences of the risk or likelihood that the risk will occur. A risk refers to anything that can prevent the Contractor from meeting contract objectives. All forms of risk shall be managed including safety, technical (hardware and software), programmatic, supportability, cost, and schedule risks.		

Contents:

The Contractor shall develop a Risk Management Plan (RMP) in accordance with SSP 50175, *ISS Risk Management Plan*. The Contractor shall describe the approach to identifying, evaluating, managing, and controlling the safety, technical, cost, and schedule-related risks associated with all aspects of the USDV. The Contractor shall describe the criteria, methods, and procedures used for identifying risk items.

At a minimum, the RMP shall include:

- a. Introduction: Specify the program/project risk objectives and policy toward risk. Explain the purpose, scope, assumptions, constraints, key ground rules, and policy pertaining to the project risk management process.
- b. Overview of Process: Provide an overview of the risk management process and information flow; describe how the risk management process integrates and relates to other project management and system engineering activities. Include general risk mitigation strategies to be employed throughout project life cycle.
- c. Organization: Describe the organization, roles, and responsibilities of program, project, customer, and supplier key personnel regarding risk management. Document how team members will be trained in the application of risk management methodology.
- d. Process Details: Provide the risk management process details and related procedures, methods, tools, and metrics. Include here, or in an appendix, the specific methodologies to be used for activities of risk management: identify, analyze, plan, track, control, communicate, and document as well as de-scope processes and risk acceptance versus closure criteria. Include the process to be used for continual assessment of the project risk profile. Describe how risk information will be communicated both internally to the project staff and throughout the NASA management chain.
- e. Documentation of Risks: Describe the process and database the Contractor will use to provide insight to current mission risks including a brief description, subsystems affected, status of ongoing root cause evaluation, mitigation efforts. Describe how the Contractor elevates risk for the impacts to the mission and how it is evaluated against its impact to the overall integrated risk assessment. Specify the format and data elements that will comprise the project risk list (and/or risk database), how configuration control will be applied, and how the list will be used and updated. Explain how team members and NASA will be able to access the current risk listing and details at any time.
- f. Key System Interfaces: Describe the relationship and interfaces of the risk management process to lessons learned reporting, System Safety analyses, reliability analyses, NASA probabilistic risk assessment (PRA), schedule, financial and other business reporting systems.
- g. Appendix: Include material that is too detailed or sensitive to be placed in the main body of text may be placed in an appendix or included as reference. Include the

appropriate reference in the main body of the text. Appendices may be bound separately but are considered to be part of the RMP document. Include an alphabetized list of the definitions for abbreviations and acronyms used in this document. Include an alphabetized list of definitions for special terms used in the document, i.e., terms used in a sense that differs from or is more specific than the common usage for such terms. Include a risk attributes scorecard that provides the criteria for establishing likelihood and consequence values of a risk.

Remarks: The final plan, as approved, shall be incorporated in the contract as Attachment J-18, *Risk Management Plan (RMP)*

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Safety & Mission Assurance (S&MA) Plan		
2. DRD No.: USDV-20	3. Data Type: 1	4. OPR: OE
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input type="checkbox"/> Administrative <input checked="" type="checkbox"/> S&MA
10. Description/Use: This S&MA Plan shall describe the assignment of responsibility organizationally and the procedures specific to S&MA requirements as required to support the requirements of the USDV SOW.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OE/ISS S&MA/Program Risk Office ON/USDV Lead Initial Submission: Initial Volume 1 - Provide with Proposal; Initial Volume 2 - Contract start + 30 calendar days Additional Submissions: Update Volume 1 and 2 at MCR; Final Volume 1 and 2 at SRR Submission Frequency: The plan shall be reviewed annually for currency and submitted by Sept 30 th , if updates are required to reflect changes to the plan. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this. Update as required to reflect changes that affect S&MA Plan implementation. Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment Interrelationship: SOW: 2.11.1 <i>Safety</i> , 2.11.2 <i>Reliability</i> , 2.11.4 <i>Quality Assurance (QA)</i> , 2.11.5 <i>NASA Advisories and Government Industry Data Exchange Program (GIDEP) Failure Experience Data Processing</i> , 2.11.6 <i>Software Safety and Assurance</i> , 3.6 <i>Mission Concept Review (MCR)</i> , 3.7 <i>System Requirements Review (SRR)</i> , 5.0 <i>Dwell (CLIN 3)</i> ; DRD: USDV-1, USDV-2, USDV-3, USDV-5, USDV-21, USDV-24, USDV-30 Applicable Documents: SSP 30312, <i>Electrical, Electronic, and Electromechanical (EEE) and Mechanical Parts Management and Implementation Plan for Space Station Program</i> ; SSP 30599, <i>Safety Review</i>		

Process; SSP 41173, Space Station Quality Assurance Requirements; NPR 8715.7, Payload Safety Program; NPR 8735.2, Hardware Quality Assurance Program Requirements for Programs and Projects; NASA-STD-8719.24, NASA Payload Safety Requirements; KNPR 8715.3, Kennedy Space Center (KSC) Safety Procedural Requirements; NASA-STD-8739.8, Software Assurance and Software Safety

Scope: The Contractor S&MA Plan shall address the Contractor S&MA philosophy, organization, approach, and key processes to meet various program and mission requirements. The S&MA Plan documents the management and implementation of the tasks needed to meet the S&MA requirements of this contract. The plan shall be organized by the major functions of an S&MA organization with a separate chapter for each discipline area. The plan shall provide process details of integrating S&MA products, tasks, and results with design and systems engineering processes to optimize the safety and mission success of the USDV.

Contents: The Contractor shall provide their corporate Safety & Mission Assurance (S&MA) Plans applicable to this contract related to Safety, Quality, Reliability, and Software. S&MA Plans shall demonstrate S&MA is incorporated into all phases of the USDV lifecycle. The S&MA Plans shall document the key activities/tasks in each discipline supported by additional process details such as flow diagrams (where applicable), analysis tools/technologies verification and validations system/tools to monitor the effectiveness and timely response of the product assurance system.

Plans may consist of a single S&MA plan or multiple plans that address the S&MA discipline areas described in this DRD.

The S&MA plan(s) shall be accompanied with a content's summary identifying where in the plan the specific items listed in the SOW, section 2.11 *Safety* and this DRD are addressed.

Volume 1

a. System Safety Plan

1. Defines the objectives, responsibilities, and methods to be used for overall system safety program conduct and control. Describes the integration of system safety provisions into the total program based on early implementation, planned safety review/process, and total program life cycle support. The level of detail in the plan directly correlates with the nature and complexity of the system safety effort required to meet program requirements and objectives. It shall provide a general description of the appropriate system safety tasks that shall become the foundation for efforts during the system definition, design, manufacture, integration and test, and operations. The elements of the System Safety Plan shall identify the interfaces with other program activities including design, development, test, operation, continuous risk management and program control (waivers, deviations, corrective actions). While individual program characteristics may vary the emphasis for a particular effort, the system safety plan shall focus on the basic elements:

2. Planning:
 - i. Identify special safety studies that may be required during system definition or design.
 - ii. Personnel requirements both in terms of skills and level of effort required for the safety program during the complete system life cycle.
 - iii. Establish safety goals and objectives to determine the type of safety input for the overall program. The goals and objectives should be identified in the initial submittal and evaluated at the major reviews.
 1. Goals shall be measurable and state what will be accomplished by performing the various safety tasks.
 2. Goals shall be structured so that safety tasks can be selected to accomplish them.
 3. Task results shall clearly demonstrate that the goals have been met.
3. Organization: The program organization and system safety relationships and responsibilities shall be described along with reporting channels for this task. The description includes any provisions for independent reporting of issues in addition to the program processes.
4. Contracting: The identification of the relationships to other program elements, subcontractor, and supplier system safety efforts.
5. Interface/Coordination: Relationships to other program planning documentation shall be identified to assure proper coordination of activities.
6. Requirements: Applicable requirements and their sources (programmatic, agency or other) shall be listed (i.e., SSP 30599, *Safety Review Process*).
7. Analysis: The plan shall stipulate hazard analysis methodologies and their intended application. System Safety analysis strategies shall define:
 - i. Concept trade studies and tests (Initial hazard identification and recommended design alternatives).
 - ii. Utilization of Hazard Analysis (HA), reliability, and NASA Probabilistic Risk Assessment (PRA) results in the design development and the process to assure the analysis maintains currency with the evolving system and program requirements.
 - iii. Inputs to test and system verification activities.
 - iv. Definition of operational system safety requirements:
 1. Redundancy
 2. Reliability analyses relationship to Hazard Reports (HRs)
 3. Technical and engineering
8. Risk assessment: The description of the role of system safety in the program

risk management process shall address:

- i. The review of pertinent historical safety data from similar systems.
 - ii. The utilization of HA and related safety assessments. This shall include the process for recommending corrective action or alternatives to the appropriate management level for a decision to either eliminate the hazard or accept the risk.
 - iii. The program definition for acceptable or residual risk. If the risk management process allows for risk acceptance at varied levels, the plan shall address the role of system safety at each level and in the notification of risk acceptance to the program manager.
9. Product Assurance Action (PAA): Describe the process and resources (i.e., personnel, databases) by which the Contractor will support PAA closure activities.

b. Reliability, NASA PRA Support, and Preventative/Corrective Ground Maintenance Plan

Provide full details of reliability and NASA PRA support organizations, plans, processes, modeling, and analyses used to accomplish higher system reliability and safety to meet USDV mission needs. Also describe the approach to designing in reliability starting from the conceptual design stage and its progressive improvement throughout the life cycle of the system. Include the following:

1. Provide details of the Contractor organizational structure of Reliability and NASA PRA support teams with reference to other organizations such as Design Engineering, Systems Engineering, and others, including interactions and interfaces with those disciplines.
2. Provide details of how the Contractor intends to perform and document a systematic review and evaluation of all Contractor reliability aspects of hardware design, development, manufacture, operation.
3. Provide details for how single point failure(s) are identified and either eliminated or communicated to NASA via the ISS Safety Review Panel (ISRP) to seek risk acceptance if elimination is not possible/beneficial.
4. Provide details of how reliability and NASA PRA support processes are integrated into the design function to improve system/subsystem reliability by influencing the design as part of the systems engineering model, risk management, and other processes, assessments, and analyses.
5. Identify ground-rules and baseline design assumptions, and planned reliability tools, including those for Probabilistic Design Analysis and structural reliability. Identify data assumptions, attributes of the model (including level, assumed relationships, etc.), timelines modeled, and capabilities modeled. Identify the method to be utilized in verification of the models provided the Government has access to this material.
6. Provide details on how the Contractor supports the development of the NASA

ISS Program PRA.

7. Define the scope, content, approach, ground rules and assumptions that the Contractor will utilize in the development and performance of reliability predictions and allocations for the USDV. The plan shall address the methods to be utilized along with any specific modifications to these methods. It shall also address data sources and model/data validation. The plan shall address the schedule and method for Bayesian updating. The plan shall address the method for maintaining systems engineering models that are compatible with the risk model developed as part of the NASA PRA to estimate and allocate component, subsystem, and human reliability values throughout the operation of the system and new developments as they occur.
8. Provide a roadmap of quantitative reliability assessments to support the program reliability requirements, risk evaluation, and reduction efforts. Included in this roadmap shall be an identification of tests used to anchor reliability models, to anchor reliability growth predictions, and to evaluate the effectiveness of failure mode risk mitigation achieved from design, fault detection and isolation, health management systems, and system maintenance. The quantitative reliability assessment roadmap shall also identify reliability metrics to be assessed and the details of the reliability growth modeling approach. The roadmap can reference internal contractor/vendor procedures, processes and controls including EEE parts selection and control, data sources, studies, etc.
9. Document how the Contractor's data collection system to support reliability and NASA PRA performance evaluation throughout the USDV life cycle will be established and maintained.
10. Description and discussions of reliability analyses results including applicable sensitivity analyses

c. Limited Life Plan

1. Provide a listing of Limited life items (limited operating-life items and limited shelf-life items), which require control from equipment date of manufacture throughout operational use, including storage. Listing shall include provisions delineating the replacement or refurbishment and criteria that is used to determine when the items will be replaced or refurbished.
2. Describe the approach and database used to track limited life items and maintenance schedules

d. Software S&MA Plan

1. Describe the Safety, Quality Assurance, Reliability, Verification and Validation, Independent Verification and Validation (IV&V), Certification, and Configuration Management activities for all computer software programs including the software portion of the firmware and complex electronic devices.
2. Describe how the Contractor's activities provide evaluations of the software lifecycle, including patches and updates, and assess the resulting software and

associated documentation to assure compliance with Contractor requirements and applicable software development plans, as well as conformance to software safety and software assurance requirements.

3. Describe how the Contractor's activities assure standards and procedural controls are established and implemented; audits, evaluations, and reviews are accomplished; procedures are followed; and all assurance activities are performed as scheduled.
4. Describe approach to Contractor software assurance is implemented during software V&V activities and show how Contractor Software Assurance collects and maintain records during the V&V efforts and provide objective evidence to NASA. Describe how the Contractor's activities ensure V&V activities satisfy functional, performance, and other requirements and that each phase of the development process has been performed and yields the right products.
5. Describe how the Contractor ensures products are in accordance with Contractor software management plan and also meets the following:
 - i. Verification that the products were developed and supported according to an approved process.
 - ii. Verification that all software products are present, complete, current, and controlled and no open nonconformances exist, which are safety or mission critical.
 - iii. Validation that the software products meet all the appropriate requirements including safety and reliability requirements.
 - iv. Validation that the software products meet the requirements contained in a joint integration verification and test plan.
6. Describe the Contractor's approach to safety critical software in accordance with NASA-STD-8739.8, *Software Assurance and Software Safety*.
7. Describe how the Contractor implements third-party IV&V requirements on the USDV contract in accordance with NASA-STD-8739.8, *Software Assurance and Software Safety*.
8. Describe how the Contractor implements its support to the NASA IV&V requirements on the USDV contract.

e. Quality Assurance Plan

The Contractor's Quality Assurance plan shall be in accordance with NPR 8735.2, *Hardware Quality Assurance Program Requirements for Programs and Projects*, and describe the Contractor's internal quality requirements, Quality organization including structure of management interfaces, and quality methods employed to ensure product quality. The Quality Plan shall also describe the philosophy and approach for implementation of the planned quality activities, including details of responsibilities and controls. This may reference the Contractor's current Quality System Manual, procedures, and work instructions, such as an outline, cross-reference matrix, etc. The

Contractor shall provide access to their Quality System Manual and first-tier procedures for review by NASA.

1. Contractor documented quality management system shall show compliance to AS9100, *Aerospace Quality Management Systems Requirements*.
2. At a minimum, the subparagraphs below shall be addressed by the present documented quality management system or subsequent submittal of a quality plan to include details of responsibilities and controls to adequately describe the specific quality assurance activities related to hardware being procured. The subparagraphs below shall be in accordance with SSP 41173, *Space Station Quality Assurance Requirements*:
 - i. Customer Quality Requirements – Describe the Contractor’s quality approach including hardware/software specific and application-specific (i.e., iterative developments, astronaut training, product transportation, and mission operations support) quality requirements imposed by contract or component/equipment specifications (i.e., traceability requirements, specific inspection points, specific quality activities including Government surveillance and inspection processing).
 - ii. Responsibilities – Describe which Contractor organizations are responsible to perform the applicable quality management system activities.
 - iii. Project Life-Cycle Reviews and Program Management Reviews – Describe how the Contractor’s quality system provides data and subject matter expertise to Project Life-Cycle Reviews and Program Management Reviews.
 - iv. Uniform Quality – Define how the Contractor develops, documents, and implements controls for those processes where uniform, high quality cannot be assured by inspection of articles alone, including but not limited to metallurgical and chemical processes, metal joining processes, bonding processes, plastics application, plating and coating processes, and surface treating processes.
 - v. Article, Material, and Service Controls – Describe the level of article, material, and service control including traceability requirements invoked by the Contractor for the articles, materials, and/or services used in or performed as part of the hardware design and maintenance criteria, including how quality is assured for each material, part, assembly, and/or service performed.
 - vi. Procurement – Describe the Contractor’s approach for all types of materials/parts/components the Contractor purchases including the quality management system requirements used for various acquisition types (e.g., systems, parts, materials, special processes); design and construction quality control requirements; the level of control exercised over the suppliers including how suppliers are approved, monitored, and maintained with controls for supplier nonconformances processing;

- and how externally sourced materials and products are certified as conforming prior to integration into systems.
- vii. Configuration Assurance – Describe how the configuration of the hardware build is compared and verified to the approved design baseline drawings and specifications. Describe how the configuration of the USDV is maintained within its certified conditions on the ground, through dwell, until launch; include details on how hardware will be retained in the appropriate stowage environment to preserve primary functions.
 - viii. Contamination/Foreign Object Debris (FOD) Control – Define the Contractor’s Contamination Control Plan to ensure that contaminant sensitive items are cleaned and controlled in accordance with documented procedures to the levels specified in the applicable technical documents and are maintained to these cleanliness levels. Describe approach to maintaining cleanliness levels for all phases of the USDV contract. The Plan shall consist of an index of the methods and procedures used to implement the contamination control and foreign object debris prevention and control requirements. These methods and procedures shall cover end-item hardware, equipment, personnel, and control of such areas as fabrication, assembly, inspection, and test. The Plan shall also include FOD control methods; early identification for FOD prevention, resistance to damage, foreign object entrapment, etc. It shall also account for manufacturing planning for minimizing FOD generation and cleanup whenever FOD is generated.
 - ix. Contractor’s Audit Program. Describe the Contractor audit program of processes, procedures, and operations, which implement the Contractor quality program. Include description of both internal and external audits. Include both audits of prime and subcontractor processes, procedures, and operations. The audits shall include examination of all operations and documentation, evaluation of actual operations as compared with established requirements and procedures, requests for corrective and preventative action, identification of root causes, documentation evidence to verify effective implementation and closure of actions. Include audit schedules and reporting procedures. Describe method and timing that Contractor will report audit results and closure of actions to NASA.
 - x. Inspection and Test - Describe who is be responsible to perform inspections. Describe any restrictions during inspections. Describe how the quality of purchased items is validated at receiving inspection or at sub-tier suppliers’ facilities. Describe specific in-process (manufacturing) inspections performed, and details of final inspection. Describe functional and environmental test monitoring details. Describe pre-ship and post-ship inspections. When applicable, provisions shall be included for development of site quality plans for

major end item test and flight test. Develop required inspections, inspection tools, and frequency of inspections, calibrations, and associated training for manufacturing and assembly activities.

- xi. Post-Production Maintenance and Repairs –Describe how the Contractor’s quality assurance system is implemented for any post-production maintenance and repairs needed.
- xii. Nonconforming Product Material Review Board (MRB) Process - Describe the process of convening a nonconforming product MRB. Discuss the MRB approach to dispositioning minor nonconforming products and how major nonconformances are elevated to NASA using a defined board of qualified personnel including Contractor quality assurance personnel and NASA representatives. MRB membership listing and qualifications shall be submitted to NASA and kept current, within the quality plan or by contract letter. Definitions of major and minor nonconformances are defined in Attachment J-04, *Definitions*.
 - 1. Describe the process in which major and minor nonconformances will be communicated to NASA.
 - 2. Describe how major nonconformances will be dispositioned and approved by NASA.
 - 3. Describe the process in which nonconformances will be dispositioned by the Contractor for nonconformances identified at the subcontractor level.
 - 4. Describe how major and minor nonconformances identified for subcontractors are elevated to NASA
- xiii. Describe how the requirements in SOW Paragraph 2.11.4 *Quality Assurance (QA)* will be met to provide audit schedules, audit reports, action closure and As Built Configuration Lists for the USDV to NASA.

Volume 2

a. System Safety Plan

- 1. Safety Review Process: The plan shall address how the Contractor meets the USDV contract requirements for the safety review processes that apply to the USDV. The plan shall also describe how the Contractor complies with the requirements in NPR 8715.7, *Payload Safety Program*, NASA-STD-8719.24, *NASA Payload Safety Requirements*, and KNPR 8715.3, *Kennedy Space Center (KSC) Safety Procedural Requirements*.
- 2. Mishap investigation: Describe the role of System Safety in the investigation, development and implementation of corrective actions and the application of lessons learned across the contractor and subcontractors process, procedures. Provisions for supporting related NASA activities in the investigation process.
- 3. Data retention: Identify the planning and maintenance of the System Safety

documentation. Data documentation shall include safety risk acceptance rationale and the associated supporting information.

b. Reliability, NASA PRA Support, and Preventative/Corrective Ground Maintenance Plan

1. Provide a database containing accessible Reliability and Maintainability parameters:
 - i. Reliability performance parameters (e.g., Mean-Time-To-Fail (MTTF), Mean-Time-Between-Failures (MTBF))
 - ii. Failure mode and failure mode distributions for each reliability performance parameter (e.g., Mean-Time-To Repair (MTTR), Mean-Down-Time (MDT), Maximum-Time-To Repair (MaxTTR), Mean-Corrective-Maintenance (MCT), Mean-Preventive-Maintenance-Time (MPT))
 - iii. Maintainability performance parameters (e.g., MTTR, MDT, MaxTTR, MCT, MPT)
 - iv. Supportability performance parameter (e.g., Mean-Time-Between-Maintenance-Events (MTBME))
2. Provide details on how the Contractor will perform and document analyses, concurrent with the design effort, to determine the ground maintenance concept and resulting preventative/corrective ground maintenance activities necessary to maintain USDV safety and reliability. Details shall include the following:
 - i. Line Replaceable Units (LRUs) and Orbital Replacement Units (ORUs) subject to ground maintenance, repair, or replacement.
 - ii. Maintainability allocations to the system, subsystem, LRUs, and below to the component level if necessary to correspond with the level at which repair/replacement is to occur for both corrective and preventive maintenance.
 - iii. Maintainability predictions at the levels for which repair/replacement may be expected involving corrective and preventive maintenance.
 - iv. Basis, decision process, engineering rationale and trade studies to decide the number of LRUs and ORUs and the justification of that number for each subsystem.
 - v. Details of Reliability Centered Maintenance and optimum levels of maintenance along with necessary justification.
 - vi. Provide maintainability assessment including MTTR, MDT, MaxTTR, MCT and MPT (as applicable) for each Maintenance Significant Item, LRU, subsystem or system along with a traceable documentation of source information, models, or processes used.
 - vii. Provide details of Contractor's spares procurement philosophy to

ensure USDV is delivered and sustained through USDV lifecycle and complete its critical mission to safely deorbit ISS. Describe Contractor's strategy for parts obsolescence mitigation and life-extension approach, if required due to unforeseen delays.

c. Software S&MA Plan

Describe how the Contractor implements a Software Quality Management System in accordance with AS9115, *Quality Management Systems – Requirements for Aviation, Space and Defense Organizations - Deliverable Software* (Supplement to AS9100).

Describe the Contractor's approach to software assurance and software safety in accordance with NASA-STD-8739.8, *Software Assurance and Software Safety* with emphasis on the following:

1. Software Documentation.
2. Software Problem Reporting and Corrective Action.
3. Software Risk Management.
4. Software Assurance Program Metrics.
5. Software Assurance Records.
6. Training.
7. Software Security Assurance.

d. Quality Assurance Plan

1. Special Process Controls – describe special process controls implemented for in-house processes and, if applicable, for sub-tier supplier processes.
2. Hazard Analysis - Assure that work authorizing documentation includes inspection verifications for any hardware developed by the Contractor that is traceable to any specific hazard analysis.
3. Preservation: Define how the Contractor intends to develop, document, and implement the controls for handling, storage, preservation, marking, labeling, packaging, and shipping operations. Document how the Contractor quality activity will review and administer controls for procedures and instructions of the controls for handling, storage, preservation, marking, labeling, packaging, packing, and shipping operations. Document the Contractor plan and controls for control storage areas
4. Production and Service Provision: Document the Contractor's plan to control and monitor articles on the vehicle, which are to be installed and removed, including shipping and handling protective materials. Document how temporary installations and removals shall be recorded for each vehicle from the first temporary installation through the life of the vehicle. Document how the Contractor quality activity shall verify that manufacturing planning documents (routing sheets, operations sheets, travelers, etc.) contain handling instructions and the identification of any special handling equipment are used to prevent damage. Document how Contractor preservation instructions,

including material and process definition are verified and are accomplished as contained in the manufacturing documents. Document how Contractor packaging operations are specified in the manufacturing documents, including sufficient detail to ensure the integrity of the packaging and the hardware, and that internal environments necessary to prevent degradation of the article or material are included in the packaging. Document how appropriate Contractor marking and labeling for packaging, storage, and shipping of articles and materials is ensured and performed in accordance with applicable specifications.

5. Design and Development of Products and Services: Support to Contractor fabrication operations, including assembly, to ensure that characteristic and design criteria specified in technical documents are obtained and maintained in all supplier fabricated articles. Contractor Fabrication documents shall include or refer to:
 - i. Nomenclature and identification of the article to be fabricated
 - ii. Tooling, jigs, fixtures, and other fabrication equipment to be utilized
 - iii. Tools techniques and methods to be used to achieve specified requirements
 - iv. Characteristics and tolerances to be obtained
 - v. Detailed procedures for controlling processes and cleaning, preservation, and packaging operations
 - vi. Special conditions to be maintained such as environmental controls, specific cleanliness levels, and precautions to be observed
 - vii. Workmanship Standards
 - viii. Inspection and test operations to be performed during fabrication
 - ix. Special handling equipment and protective devices
6. Validation and Control of Special Processes: Document how Contractor personnel are trained and certified for processes and non-destructive evaluation (NDE); how techniques and processes have been certified; how Contractor facilities, equipment and materials for process control and NDE have been installed and how their use and maintenance are controlled; how resulting documentation, feedback, and records are controlled; document how NDE coordination with the cognizant engineering has been implemented and how it will be documented on the drawings; and that Contractor personnel training and process certification procedures have been documented and accepted. Describe the Contractor's integrated approach to NDE, including organizational assignments, facilities, standards, and procedures. Develop and document specific Contractor inspection procedures and nondestructive evaluation techniques to be used during safing, transport, etc.; list the inspection and test procedures, test specifications, and processes for NDE techniques for maintenance and ground operations; define special equipment (NDE) needed to perform major inspections

7. Operational Planning and Control: Indicate how the Contractor production, installation and servicing processes will be controlled to ensure specific requirements are met. As a minimum the Contractor Quality Assurance (QA) plan shall include the following:
 - i. Processes, procedures, and specifications
 - ii. Process steps
 - iii. Methods to be used to monitor and control processes and product characteristics
 - iv. Acceptability criteria for workmanship
 - v. Use of qualified processes, associated equipment, and personnel
 - vi. Tools, techniques, and methods to be used to achieve specified requirements
8. Maintain an up-to-date listing of all Contractor process control procedures and process specifications used in fabrication, control, and inspection of the materials and articles fabricated.
9. Document the Contractor process control plan (how production, installation, and servicing processes will be controlled to ensure that specified requirements are met).
10. Verification of Key Characteristics - Assure that the verification of Key Characteristics associated with hazards (catastrophic or critical) involving Critical Items are verified by personnel independent of those performing the work (e.g., Quality Assurance)
11. Training and Certification - Assure that personnel performing operations or inspections are properly trained and/or certified, (e.g., electronic workmanship, welding, soldering, NDE, leak testing) and maintain their proficiency. Also identify the suppliers' compliance with personnel training and certification requirements in accordance with, and when required by, the applicable technical standards for the work being performed (e.g., manufacturing, test, inspection), prior to performing that work (e.g., calibration, soldering, electrical harness installation, nondestructive evaluation, process witnessing, product inspection).
12. Record Retention – Describe how the Contractor generates and maintains records and data of all Contractor and subcontractor inspections and tests performed. Describe how Contractor records, specific to the product or project, are to be controlled. For those records not submitted to NASA, specify how records and data are retained for 3 years post mission completion, how the records and data are to be dispositioned at the end of the retention period, and/or as specified in the contract.
13. The Contractor's Quality Plan shall also describe their approach to:
 - i. Quality Workmanship Standards to be used

- ii. Metrology and Calibration
- iii. EEE Parts Control in accordance with SSP 30312, *Electrical, Electronic, and Electromechanical (EEE) Parts Management and Implementation Plan for the Space Station Program*
- iv. Electrostatic Discharge Control
- v. Configuration Management System
- vi. Processes and Products
- vii. Counterfeit Clauses
- viii. Guarantee of Product Source(s)
- ix. Test and Inspection Requirements
- x. Product Impoundment and Financial Responsibility
- xi. Government Right of Access
- xii. Non-destructive Inspection)/Non-destructive Test Certification

e. The NASA Advisory and Government-Industry Data Exchange Program (GIDEP) Problem Data Sharing and Utilization Program Documentation and Reporting Implementation Plan

1. Describe how Contractor and sub-tier implementation procedures are accomplished for NASA Advisories, GIDEP Notices and other Notices are prepared and responded to in accordance with NASA Policies and GIDEP Operations Manual.
2. Describe how Contractor initiated GIDEP Notices:
 - i. Address essential detail required identifying problem types and/or manufacture's name, special requirements and environments, the problem situation (condition) and cause, actions taken and recommendation. Such data shall be restricted to objective, factual information.
 - ii. Identify names of responsible individuals and organizations that may be contacted for further technical details.
 - iii. How contractor initiated GIDEP Notices that are of general concern will be coordinated with NASA-JSC Advisory Coordinator, and how the Contractor or its sub-tier contractor will complete the appropriate GIDEP Form and submit to GIDEP, in accordance with the GIDEP Operations Manual.
 - iv. How the contractor will collaborate with the NASA-JSC Center Advisory Coordinator to generate and coordinate NASA Advisories utilizing the NASA Advisory Reporting System (NARS).

Note: NARS will coordinate the NASA concurrence (i.e., legal and export control) in accordance with NASA policies.)

- v. Describe how the contractor will respond to the NASA Advisory, Notices and Alerts, Distribution and Response Tracking System (NANADARTS), <https://nanadarts.nasa.gov/> to NASA Advisories, GIDEP and other Notices with one of the following categories:
 - 1. No Usage
 - 2. Usage with No Impact along with rationale/justification for continued usage/corrective action
 - 3. Usage with Impact including rationale/justification and corrective/preventive action.
 - vi. How the contractor shall keep NASA Program and Center Advisory Coordinator informed of open, on-going investigations, counterfeit, undetermined, or suspected usage.
 - vii. Follow-up reports on results of investigations, analyses, etc. may be extended beyond the allowed working days for the initial report upon request to <https://nanadarts.nasa.gov/>. NASA Advisory, GIDEP, and other Notices may be closed out if no corrective action required; and
 - viii. No response required on NASA Advisory, GIDEP, and other Notices distributed by NANADARTS as 'Information Only' unless usage is identified.
 - ix. Cost data shall be gathered and provided upon request. This data may be used in support of criminal investigations.
 - x. Contracted initiated GIDEP Notice – The proposed GIDEP Notice will be coordinated with the NASA-JSC Advisory Coordinator as defined in the GIDEP implementation plan.
 - xi. Should the situation arise of immediate urgency and there is insufficient time to process a GIDEP Notice, a NASA Advisory may be utilized with the pre-coordination of the NASA-JSC Coordinator. Subsequently, the Contractor shall follow up with the appropriate GIDEP Notice, as necessary, in accordance with the GIDEP Policies for dissemination to all GIDEP participants.
3. Describe how the Contractor ensures a procedure is in place to support all NASA Advisory and GIDEP information to include:
- i. Documentation of the current implementation procedures and NASA Advisory and GIDEP policies.
 - ii. Procedures to ensure released NASA Advisory and GIDEP information is gathered, tracked, reviewed, captured, and retained in a contractor electronic database for applicability to ensure factual investigation and reporting of suspect parts.
 - iii. Logistics parts tracking, tagging, segregation, and retention of suspect parts or material in the custody of the Contractor pending final

disposition instructions from the CO or CO Technical Representative with concurrence from the NASA-JSC Advisory/GIDEP Coordinator.

4. Describe how the Contractor and its subcontractors and vendors actions ensures that all NASA Advisories, Missile Defense Advisories (MDAs), Mishap Warning-Actions Response (MWAR), and applicable GIDEP Notices (i.e., ALERTs, SAFE-ALERTS, Problem Advisories, and Agency Action Notices (unlimited/limited, as necessary), are:
 - i. Status reported (e.g., assessment and disposition) in the closed-loop NANADARTS at <https://nanadarts.nasa.gov/>;
 - ii. Initiate NASA Advisories, for situations unique to NASA;
 - iii. Provide status supporting Program Fight Readiness Reviews; and
 - iv. Initiate problem reports, in accordance with Program Requirements, when NASA Advisory and/or GIDEP investigation uncovers usage in their hardware or software.
5. The Contractors' format is acceptable for their internal implementation plan. GIDEP Notices are to be prepared on the appropriate GIDEP form in accordance with the GIDEP Manual and Policies and Procedures. NASA Advisories are to be coordinated with the NASA-JSC Advisory Coordinator utilizing NARS. The contractor's format is acceptable for providing the task management, control, and tracking status, provided it includes all the necessary information (NASA Advisory/GIDEP Notice number, disposition status, part numbers affected, the system affected, a risk analysis along with a mitigation plan for acceptance of, continued usage, and/or corrective/preventive action).

Remarks: The final plan, as approved, shall be incorporated in the contract as Attachment J-19, *Safety & Mission Assurance (S&MA) Plan*

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Safety Data Package (SDP)		
2. DRD No.: USDV-21	3. Data Type: 1	4. OPR: OE
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input type="checkbox"/> Administrative <input checked="" type="checkbox"/> S&MA
10. Description/Use: The contractor shall submit a SDP at each phase of the safety review process. Reliability Analysis and Failure Modes and Effects Analysis (FMEA) shall be included as part of the SDP as described in the body of the DRD.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OE/ISS S&MA/Program Risk Office ON/USDV Lead Initial Submission: 20 working days prior to Phase 0 Safety Review Additional Submissions: 20 working days prior to Phase I Safety Review; 20 working days prior to Phase II Safety Review; 20 working days prior to Phase III Safety Review. Submission Frequency: N/A Format: Contractor provided format. HRs and associated safety data shall be uploaded to the ISS Hazard System. Interrelationship: SOW: 2.11.1 <i>Safety</i> , 2.11.2 <i>Reliability</i> , 2.11.3 <i>Probabilistic Risk Assessment (PRA)</i> , 2.11.6 <i>Software Safety and Assurance</i> , 3.7 <i>System Requirements Review (SRR)</i> , 3.9 <i>Preliminary Design Review (PDR)</i> , 3.10 <i>Critical Design Review (CDR)</i> , 4.4.3 <i>Phase III Safety Review</i> ; DRD: USDV-3, USDV-20 Applicable Documents: SSP 30234, <i>Failure Modes and Effects Analysis and Critical Items List Requirements for Space Station</i> ; SSP 30599, <i>Safety Review Process</i> ; NPR 8715.7, <i>Payload Safety Program</i> ; NASA-STD-8719.24, <i>NASA Payload Safety Requirements</i> ; KNPR 8715.3, <i>KSC Safety Procedural Requirements</i> Scope: The SDP shall address the ground and flight hazards that arise in the design, development, manufacturing, construction, facilities, maintenance, testing, inspection, operations, and reentry associated with the hardware, software, operations, and environment. The SDP provides a total assessment of the USDV (hardware and software) and its operational environment. The hazard analyses shall cover the complete program life cycle		

from concept definition until program completion and vehicle reentry. The HRs identify hazards, determine the methods used for controlling the hazards, support the program risk management process, establish verification methods, and assure closure for the identified hazard.

Contents:

- a. The implementation approach for the Safety Data Packages (SDPs) shall be consistent with the *Safety and Mission Assurance Plan (DRD USDV-20)*.
- b. Scope of Analyses
 1. SDP, including Hazard Reports (HRs). This report shall document the Hazard Analyses performed for the USDV.
 2. Reliability Analysis. This analysis shall document the reliability of the USDV.
 3. Failure Modes and Effects Analysis (FMEA). Documentation of this analysis shall be provided for the USDV safety noncompliances and single point failures.
- c. Analytical Methods and Requirements
 1. SDP, including HRs. The SDP and HRs shall be developed in accordance with SSP 30599, *Safety Review Process*.
 2. Reliability Analysis. This analysis shall be performed in accordance with the Reliability Plan defined in *Safety & Mission Assurance (S&MA) Plan (DRD USDV-20) Reliability, PRA Support, and Preventative/Corrective Ground Maintenance Plan*.
 3. FMEA. This analysis shall include the following at a minimum: a summary of the analysis methodology, a list of ground rules and assumptions, and FMEA work sheets. This analysis may be developed using the Contractor's existing FMEA methodology or using SSP 30234, *Failure Mode and Effects Analysis and Critical Items List Requirements for Space Station*. The FMEA worksheets delivered by the Contractor shall include the following from SSP 30234, *Failure Modes and Effects Analysis and Critical Items List Requirements for Space Station*, Appendix C, Paragraph C.3 DATA ELEMENTS: 1-27 and 30-50.
- d. Phased Safety Reviews and SDP Submittals

This section has been separated between Part 1 and Part 2 to coincide with the CLIN structure defined in *Project Life-Cycle Review Plan and Data Packages (DRD USDV-3)*. Part 1 occurs during CLIN 1. Part 2 occurs during CLIN 2.

Part 1

- a. Phase 0 Safety Review

The Phase 0 review is a review conducted at an appropriate time during the requirement definition and conceptual design. The review is for the Contractor to begin discussions and obtain guidance from NASA on safety-related concerns. The review will also give NASA familiarity with the system, safety analysis approach, and

address areas of concern. When requirements will not be met, the discussion should include why the design solution provides an acceptable approach for controlling hazards, the rationale for confidence in the proposed design solution, and why the risk is low and should be acceptable to NASA. USDV safety critical functions will be of particular focus and include but are not limited to:

- Functions needed for successful rendezvous and docking (Attitude control and Translational maneuvers, Guidance Navigation and Control (GNC) (including control laws and gains), Relative GNC, and associated support functions)
- Functions needed for successful deorbit operations (Attitude control and Translational maneuvers, GNC (including control laws and gains), and associated support functions)

The Phase 0 Technical Interchange Meeting (TIM) shall include the following minimum set of data:

1. Introductions and Agenda
2. Scope and Objective
3. System Overview
 - i. Organizational Structure
 - ii. System Description
 - iii. Critical Functions
 - iv. Interface Overview
 - v. Operations
4. Presentation of Analysis Approaches
5. Overview, Ground Rules, and Assumptions
 - i. Preliminary Hazard Analysis (HA) with a focus on hazard identification
 - ii. Reliability Approach and system level reliability allocations
 - iii. Preliminary list of hazardous commands and/or commands that could result in a hazardous condition if executed outside the window of operations.
 - iv. Preliminary Computer Based Control System Compliance Matrix.
6. Preliminary Approach for Controlling Hazards
 - i. List of failure tolerance approach for safety critical systems, subsystems, components, and functions
 - ii. List of candidate safety noncompliances and single point failures
 - iii. Identify safety critical systems, subsystems (including software) and components that can fail but still operate, systems/subsystems/components that must fail OFF, and the associated

impact with completing the mission.

- iv. Identify safety critical systems, subsystems (including software) and components and address common cause failure, their mitigations, and when similar/dissimilar redundancies are necessary
- v. Identify heritage systems/subsystems/components planned for use within the USDV design that do not meet two fault tolerance/design for minimum risk and any redesigns/test/analyses that would be necessary to meet two fault tolerance/design for minimum risk.

7. Special Topics (Including any Areas of Concern)

8. Forward Plan for Phase I

b. Phase I Review and SDP

The SDP for the Phase I Safety Review shall include the following minimum set of data with focus on hazard causes and controls:

1. Updates to all data delivered at Phase 0 to a Preliminary Design Review (PDR) level of maturity.
2. An overview description of the design and operations of the USDV being addressed in the review including the following:
 - i. A brief description of the USDV
 - ii. Interfaces to ISS
 - iii. Planned and proposed functions
 - iv. Operational scenarios related to all mission phases
 - v. Figures or illustrations to show all major configurations and identify all hazardous systems and subsystems
3. Functional, power, and control circuit technical documentation and drawings (at a PDR level) reflecting known safety features, inhibits, controls, support system interfaces, power channelization, etc. Identify and document independence of inhibits and associated controls.
4. SDP, HRs, and appropriate supporting data, per ISS Safety Review Panel (ISRP) Phased Safety Review deliverable checklists.
5. In the HR, reference applicable standards that will be used to comply with S&MA requirements.
6. Provide acceptance rationale for any identified Noncompliance Reports
7. Provide drawings (at a PDR level) of components and mechanism that show the internal parts, flow paths, seals, housings, springs, position indicator switches, mechanical fluid fittings, electrical connectors, etc.
8. FMEA, at a PDR level of maturity, for any safety noncompliances or single point failures
9. Reliability analysis and NASA PRA support inputs at a PDR level of maturity

including data sources, tools, ground rules and assumptions, and the following:

- i. Quantitative reliability allocations from system level down to the LRU/component level.
 - ii. Quantitative reliability predictions with traceable documentation of data source information, failure rate estimation factors, models, reliability performance parameters (e.g., Mean-Time-To-Fail (MTTF), Mean-Time-Between-Failures (MTBF)), and failure mode distributions for each reliability performance parameter.
 - iii. Comprehensive equipment list of the USDV hardware delineating the items and/or components for which reliability analyses and predictions are performed.
10. For safety critical software used to control a hazard or where loss of a safety critical function or erroneous output can result in a critical or catastrophic hazard, provide an overview of the software architecture.
 11. Critical procedures and processes that warrant special monitored verification and/or inspections.
 12. Preliminary ground processing hazards in accordance with NPR 8715.7, *Payload Safety Program*, NASA-STD-8719.24, *NASA Payload Safety Requirements*, and KNPR 8715.3, *KSC Safety Practices Procedural Requirements*.
 13. Preliminary maintenance assessment for ground maintenance activities.
- c. Phase II Review and SDP

The SDP for the Phase II Safety Review shall include the following minimum set of data with focus on hazard causes, controls, and verifications:

1. Updates to all data delivered in the Phase I SDP to a CDR level of maturity, per ISRP Phased Safety Review deliverable checklist.
2. Status or closure rationale of open action items and agreements assigned during the Phase I Safety review.
3. When shown in diagrams, clearly label inhibits and their associated controls. Identify and document independence of inhibits and associated control.
4. Provide an updated list of safety critical software requirements applied to the design, an updated list of the hazardous commands and safety critical computing system components (including but not limited to Computer Software Configuration Items (CSCIs), Computer Software Units, and Computer Software Components.
5. A sufficiently detailed description of the approach that is planned to be used for each hazard control verification and why that approach will be suitable for verifying the intended function of that hazard control.
6. For hazard controls requiring inspection verification, the Contractor shall reference the work-authorizing document that implements that inspection in

the hazard analysis.

7. Mapping to show that all uneliminated single point failures are addressed in the hazard analysis.
8. Identify test plan limitations (i.e., end-to-end system fidelity, model anchoring, test facility, historical performance, supplier quality, exceptions to test-as-you-fly).
9. Identify any previous anomalies/issues associated with hardware/software components used, including those used in non-NASA missions.
10. Any other relevant safety data.

Part 2

a. Phase III Review and SDP

1. The SDP for the Phase III Safety Review shall include the following minimum set of data with focus on verification closure review and approval:
2. Updates to all data delivered in the Phase II SDP to a System Acceptance Review (SAR) level of maturity, per ISRP Phase Safety Review deliverable checklists.
3. Closure rationale of open action items and agreements assigned during the Phase I and Phase II Safety reviews.
4. Schematics reflecting the as-built and as-verified design.
5. All verification evidence (based on the NASA system requirements or derived by the safety process) have been reviewed by the ISRP prior to Phase III completion. The Contractor shall negotiate with the ISRP any verifications that can be transferred to the Safety Verification Tracking Log. The Contractor shall provide and maintain a Safety Verification Tracking Log as described in SSP 30599, *Safety Review Process*.

b. Final SDP Approval

1. NASA will have approval of the final SDP, HRs, and flight safety certificate. Approval will be based on the criteria defined in SSP 30599, *Safety Review Process*.

Remarks: N/A

Maintenance: DRD deliverable submittals shall include redlines incorporated showing the updates made since the last submittal.

1. DRD Title: Mishap Preparedness and Contingency Plan		
2. DRD No.: USDV-22	3. Data Type: 2	4. OPR: OE
5. Solicitation No.: <i>To be filled in by CO at final RFP release</i>		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input type="checkbox"/> Technical <input type="checkbox"/> Administrative <input checked="" type="checkbox"/> S&MA
10. Description/Use: Contingency Action Planning involves planning and coordination between NASA and the Contractor before a mishap occurs and addresses responses. The plan provides NASA with an understanding of the Contractor's processes notifying NASA of mishaps, as well as how the Contractor plans to investigate and establish corrective action plans for mishaps that occur while performing the work required in support of this SOW. The Contractor shall develop the plan to include the elements listed below and implement the plan as necessary.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OE/ISS Safety and Mission Assurance/Program Risk Office ON/USDV Lead Initial Submission: Initial Contract Start + 30 working days Additional Submissions: Final MCR Submission Frequency: The plan shall be reviewed annually for currency and submitted by Sept 30 th , if updates are required to reflect changes to the plan. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this. Format: Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment Interrelationship: SOW: 2.11.10 <i>Mishap</i> , 3.6 <i>Mission Concept Review (MCR)</i> ; DRD: USDV-3, USDV-18 Applicable Documents: NPR 8621.1, <i>NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating and Recordkeeping</i> , SSP 50190, <i>Contingency Action Plan</i> , JPR 1700.1, <i>JSC Safety and Health Requirements</i>		

Scope: The Mishap Preparedness and Contingency Plan is applicable to the USDV activities that result in onsite (at NASA Center or Facility), off-site (non-NASA Center or Facility), in-flight, and in-space incidents defined as a mishap or close-call.

Contents:

1. **GENERAL:** Mishap reporting, investigation, and corrective action requirements differ according to whether the specific mishap occurs on NASA property. Mishaps occurring on third-party property will be handled in the same manner as those occurring on Contractor property.
2. **NASA MISHAP:** An unplanned event that results in at least one of the instances identified below, which supplement the definitions found in NPR 8621.1, *NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping* and have been tailored for USDV:
 - a. Injury to non-NASA personnel, caused by NASA operations.
 - b. Damage to public or private property (including foreign property), caused by NASA operations
 - c. Occupational injury or occupational illness to NASA personnel.
 - d. NASA mission failure before the scheduled completion of the planned primary mission.
 - e. Destruction of, or damage to, NASA property except for a malfunction or failure of component parts that are normally subject to fair wear and tear and have a fixed useful life that is less than the fixed useful life of the complete system or unit of equipment, provided that the following are true: 1) there was adequate preventative maintenance; and 2) the malfunction or failure was the only damage and the sole action is to replace or repair that component.

2.1 Mishap classification shall occur as documented in NPR 8621.1, *NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping* and JPR 1700.1, *JSC Safety and Health Requirements*.
3. **ONSITE MISHAPS OCCURRING ON NASA PROPERTY:**
 - 3.1 Mishap Reporting. The Contractor shall notify JSC via *JSC Form (JF) 1627* of all mishaps and “close calls” involving property damage or first aid (as defined by NPR 8621.1, *NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating and Recordkeeping*), which occur onsite at a JSC-administered establishment. This includes Government owned, and contractor operated facilities, as well as the local safety office in accordance with local reporting requirements for all Type A or B injury or property damage mishaps occurring on on-JSC NASA property while performing work in support of this Statement of Work (SOW).
 - 3.2 Emergency Reporting. For all onsite emergencies, immediately notify both emergency response (e.g., Center emergency number, 911, fire, ambulance, Center security office), and a supervisor, management official, or a safety/health staff member of the circumstance of the mishap in accordance with the local emergency reporting requirements. The Contractor shall ensure that contract employees on

NASA property know and comply with local safety, health, and emergency response requirements. The Contractor's plan shall describe the processes required to accomplish this task.

Note: As a minimum, evaluate credible potential emergencies your employees will face, which will include emergencies such as fire evacuations, weather emergencies, workplace violence. Also consider potential of emergencies from nearby operations or emergencies in other areas that your employees routinely visit.

4. MISHAPS OCCURRING ON CONTRACTOR PROPERTY, THIRD PARTY PROPERTY OR OTHER NON-NASA GOVERNMENT PROPERTY:

- 4.1. Initial report within 24 hours of the mishap containing basic information that identifies personnel injured, the property damaged or lost, and the name and contact information of the appointing official and investigator. The Contractor shall notify JSC Safety Office via JF1627, *JSC Mishap Form* in the event of Type A or B mishap and C property damage mishaps to personnel or NASA property while on Contractor, third party property or other non-NASA government property. The Contractor's plan shall describe the process through which notification will take place.
- 4.2. Mishap investigation and corrective action for mishaps on Contractor property, Third Party property, or other non-NASA Government Property.
 - a. An initial investigation by the Contractor is required for all mishaps, which have been reported to NASA. NASA reserves discretionary authority to investigate mishaps which involve NASA personnel or resources regardless of location. The Contractor has the discretion to perform any collateral investigations. However, investigations implemented by NASA will take priority regarding access to evidence, data, and witnesses. The proceedings of NASA investigations will remain confidential. The Contractor will have an opportunity to comment on the investigation report in accordance with NASA protocols.
 - b. Interim Reporting. Contractor shall describe content of interim reports that bring attention to specific issues such as product safety or performance defects; procedural issues; or other items of an urgent nature requiring an immediate and timely intervention by other parties.
 - c. Corrective Actions. After the Contractor completes its investigation of the mishap and, when appropriate, has developed a plan of corrective action that is traceable to findings, root causes, contributing factors, and recommendations, and specific assignee with estimated completion dates. This plan will include any verification activities identified by the Contractor to ensure that corrective actions to be implemented by NASA or a third party have been implemented or, if applicable, accomplished. The Contractor shall deliver this completed report to NASA within 15 working days of completion.
 - d. Contractor Final Report. The Contractor's final report shall identify which parts of the report are proprietary for business reasons or otherwise

controlled for reasons of security. The report is due within 15 working days of completion. The Government reserves the right to initiate release of the report as specified in NPR 8621.1, *NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping*. The Contractor's final report shall identify which parts of the report are proprietary for business reasons or otherwise controlled for reasons of security.

5. MISHAPS OCCURRING POST LAUNCH AND DURING INTEGRATED OPERATIONS

- 5.1 Immediate notification and reporting of mishaps occurring during integrated operations shall follow guidelines and requirements as documented in SSP 50190, *Contingency Action Plan*. Mishaps and anomalies occurring during integrated operations shall also be reported, investigated, and tracked in accordance with MGT-OA-019 Revision B, *On-Orbit Anomaly Resolution Process*.
- 5.2 All USDV mishaps occurring during integrated operations which impact the ISS will be considered NASA Mishaps, specifically an ISS Program Mishap.
 - a. The Contractor shall describe the approach for providing subject matter expert support to NASA for any Mishap investigations. Describe how data will be managed and the means in which evidence, data, and witnesses will be available to NASA. The proceedings of NASA investigations will remain confidential. The Contractor will have an opportunity to comment on the investigation report in accordance with NASA protocols.
 - b. Interim Reporting. Contractor shall describe content of interim reports that bring attention to specific issues such as product safety or performance defects; procedural issues; or other items of an urgent nature requiring an immediate and timely intervention by other parties.

Remarks: The final plan, as approved, shall be incorporated in the contract as Attachment J-20, *Mishap Preparedness and Contingency Plan*

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Technology Readiness Level (TRL) Assessment and Technology Maturation Plan		
2. DRD No.: USDV-23	3. Data Type: 1	4. OPR: EA
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The TRL Assessment and Technology Maturation Plan documents the contractor's approach to maturing new or unproven technologies or technologies with spaceflight heritage but in different applications for USDV application.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OE/ISS S&MA/Program Risk Office ON/USDV Lead Initial Submission: Initial - Submit with Proposal Additional Submissions: Update at MCR, Final at SRR; Update at SDR; Update at PDR, Update at CDR Submission Frequency: Update as required to reflect changes that affect TRL Assessment and Technology Maturation Plan implementation. Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment Interrelationship: SOW: 3.6 <i>Mission Concept Review (MCR)</i> , 3.7 <i>System Requirements Review (SRR)</i> , 3.8 <i>System Definition Review (SDR)</i> , 3.9 <i>Preliminary Design Review (PDR)</i> , 3.10 <i>Critical Design Review (CDR)</i> ; DRD: USDV-2, USDV-3 Applicable Documents: NPR 7123.1, <i>NASA System Engineering Process and Requirements</i> Scope: The TRL Assessment and Technology Maturation Plan documents the Contractor's approach for maturing new or unproven component(s), subsystem(s), or system(s) at or below a TRL of 6; which are used in new applications or environments; and describes the plan to mature these technologies and integrate them at the USDV level.		

Contents:

The Technology Readiness Level (TRL) Assessment and Technology Maturation Plan contains three parts which are described below. Part 1 identifies any component, sub-system, or system at or below a TRL-6. Part 2 identifies items used in new applications or environments. Part 3 describes the plan to mature technologies and integrate at the USDV level.

PART 1: TRL ASSESSMENT

The contractor shall identify any component, sub-system, or system at or below a TRL of 6 per the definitions in Appendix E of NPR 7123.1 *NASA System Engineering Process and Requirements* and agreement with NASA. The contractor shall also provide supporting rationale for the selection of the identified component(s), sub-system(s), or system(s).

Identified items shall include:

- a. The current TRL and previous activities and development that brought the item to its current state of readiness;
- b. The criticality of the item to mission success or safety;
- c. The probability or likelihood that the technology will be successful;
- d. The cost, schedule, and performance penalty incurred if an alternate solution is used (include this as part of Contractor's risk assessments and document them in the Contractor's Risk Register);
- e. The approach, milestones, and high-level cost estimate of the development strategy for this item; and
- f. The effects of the development strategy for this item on other technical portions of the project.

All of the identified technology gaps and technical assumptions that require resolution or validation shall be assessed for impact to the overall system design.

PART 2: TECHNOLOGY APPLICABILITY

The contractor shall identify any component(s), sub-system(s), or system(s) with spaceflight heritage that may have been used in different applications and/or environments and present their plan to show current acceptability or planned delta qualification for the relevant USDV application and/or environment.

PART 3: TECHNOLOGY MATURATION PLAN (TMP)

The TMP shall describe the approach, steps, and activities for maturing technologies, including the consideration of alternative technologies.

The contractor shall provide their plan to mature any component, sub-system, or system identified as being at or below TRL-6 to achieve TRL-6 by Preliminary Design Review (PDR) and TRL-7 by Critical Design Review (CDR) including:

- a. Schedule of development activities and key trade studies
- b. Contractor decision points, such as proceeding with or abandoning the current technology or selecting a backup technology

- c. Test plans and success criteria for all development tests necessary to advance TRL readiness
- d. Key technical and schedule risk items
- e. Mitigation plans for the situation where an identified component, sub-system, or system TRL maturation effort will not support USDV mission requirements or schedule

The contractor shall describe the approach to mature USDV technologies on existing contracts or NASA missions, if applicable. The implementation on existing contracts or NASA missions shall meet the requirements of the host contract. The approach shall include:

- a. Description of technology maturation proposed for USDV
- b. Timeline for incorporation into the overall USDV Design, Development, Test, and Evaluation (DDT&E) and Technology Maturation effort.
- c. Details on implementation on the existing contract/NASA mission and approach to meeting the host contract requirements
- d. Benefits to overall technology maturation plan

All of the identified technology gaps and technical assumptions that require resolution or validation shall be assessed for impact to the overall system design. The elements that require significant redesign, if shown to not perform as expected, shall be addressed early in the technology maturation process. This allows implementation of alternative approaches and other backup strategies.

Remarks: The final plan, as approved, shall be incorporated in the contract as Attachment J-21, *TRL Assessment and Technology Maturation Plan*

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Software Management Plan (SMP)		
2. DRD No.: USDV-24	3. Data Type: 1	4. OPR: OD
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: Describes the approach for managing and conducting the software development effort and the sustaining engineering of the USDV software, ground software, and software systems from development through on-orbit sustaining.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OD/ISS Avionics & Software Office ON/USDV Lead Initial Submission: Initial at MCR Additional Submissions: Final at SRR Submission Frequency: The plan shall be reviewed annually for currency and submitted by Sept 30 th , if updates are required to reflect changes to the plan. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this. Update as required to reflect changes that affect Software Management implementation. Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment Interrelationship: SOW: 2.9.2 <i>Design, Analysis, and Trades</i> , 2.10 <i>Software Management</i> , 3.6 <i>Mission Concept Review (MCR)</i> , 3.7 <i>System Requirements Review (SRR)</i> , 3.9 <i>Preliminary Design Review (PDR)</i> , 3.10 <i>Critical Design Review (CDR)</i> , 6.1 <i>General Requirements</i> ; DRD: USDV-2, USDV-3, USDV-20 Applicable Documents: SSP 50482, <i>ISS Program Software Management Plan</i> , NPR 7150.2, <i>NASA Software Engineering Requirements</i> Scope: The SMP describes the approach for managing and conducting the software development effort and the sustaining engineering of the USDV software, ground software,		

and software systems from development through on-orbit sustaining. The plan provides insight into and is a tool for monitoring the processes and methods to be followed for software development, maintenance, and sustaining, and the approach to be followed for each activity, based on project schedules, organization, and resources. This Plan details the software systems, project documentation, project schedules, resource requirements and constraints, and general and detailed software management activities. Software development includes new development, modification, reuse, re-engineering, maintenance, and all other activities resulting in software products.

Sustaining engineering includes the methods, approaches, processes, and responsibilities for controlled release of the flight software, software systems, configuration data, and associated documentation as modifications occur as a result of discrepancy/problem reports and change requests. The SMP shall cover the complete software development life cycle for the USDV project, including software planning, development, testing, maintenance, retirement, operations, management, acquisition, and assurance activities. In the context of SSP 50482, *ISS Program Software Management Plan*, the USDV Contractor is an ISS Partner & Participant (IP/P), and the USDV flight software is system software related to integrated operations and directly controls safety-critical operations. This applies to all software created, acquired, or maintained by the project. Software is defined in NPR 7150.2D, Appendix A, *NASA Software Engineering Requirements*, and includes software used in embedded devices such as programmable logic devices (including but not limited to Field-Programmable Gate Arrays (FPGAs), Firmware, Programmable Logic Devices, etc.).

Contents:

- a. The Software Management Plan (SMP) shall be compliant with SSP 50482, *ISS Program Software Management Plan*, and specifically address the interfaces with NASA organizations, boards/panels, and facilities.
- b. The SMP shall contain:
 1. System overview, including operational use concept, identification of software components, their functions and characteristics, and their interfaces, planning assumptions, and constraints
 2. Software project organization and management showing authority and responsibility of each unit and relationships to organizational units outside of software (e.g., S&MA, Communication and Tracking (C&T), Command and Data Handling (C&DH), Avionics, Operations, Systems Engineering, etc.), and resource requirements and constraints.
 3. Software configuration and change management for development through sustaining
 - i. Description of Software configuration management process
 - ii. Description of Software change control process
 - iii. Change management
 - iv. Release management
 4. Software lifecycle and development planning

- i. Software life cycle model(s) to be used, including software development phases and their sequence.
 - ii. System and software schedules and reviews of deliverables as specified in the Statement of Work (SOW) and where the reviews occur in the software life cycle model(s).
 - iii. Key software deliveries and where they occur in the software life cycle model(s).
 - iv. Software update/upgrade planning and release management
 - v. Software Retirement
5. Logic device re-programmability trade study showing that the full list of avionics including logic devices (firmware, FPGAs, etc.) has been assessed for mission suitability to ensure that each device's mission criticality, complexity, risk, and likely need for updates were taken into account to determine the device selection, architecture and method required for update.
6. Software test planning
 - i. Test philosophy
 - ii. Overall approach for the effective and efficient removal of software defects, including levels of test and success criteria for progressing from one level to the next
7. Software risk management
8. Software security
9. Identification of any open source, Commercial-Off-The-Shelf (COTS) Software, and modified COTS software being used.
 - i. Approval required by regulations, required certifications, propriety, usage, ownership, warranty, and licensing rights.
 - ii. Each subcontractor involved in any part of the software development effort must either have their own SMP or be explicitly included in an over-arching SMP.
10. Software Maintenance section including,
 - i. Sustaining Engineering processes and procedures
 - ii. Software upgrade content scheduling, implementation, and tracking
 - iii. Discrepancy/Problem Report analysis, development, and certification plans
 - iv. Proactive plan to review, assess, disposition, and if necessary, remediate “issues” (problems, bugs, security vulnerabilities, vendor-supplied patches, etc.) in software and impacted firmware including COTS components (such as platform, drivers, operating system, tools) using internal analysis and supplier issue notification systems (such as supplier errata, security notifications, patch notifications).

- v. An approved plan for communicating relevant software issues, and their dispositions (such as fixes, workarounds, use as-is including impact, and flight rationale).
- vi. Equipment and facilities required for development and certification
- vii. An approach for providing NASA with the Software Version Description Data of released software products (e.g., revision number, licensing agreements).

11. Software Assurance

12. Software Work Breakdown Structure (WBS)

13. Software distribution to NASA facilities and users of the software products

14. Installation in the target environment including, but not limited to,

- i. USDV Flight System
- ii. Simulations and Emulators
- iii. Software Development and Integration Laboratory (SDIL)/Mission Build Facility
- iv. Mission Control Centers (MCCs)
- v. Ground Operations Facilities
- vi. Space Station Training Facility

15. NASA approval methods for software including communication and customer access plan for:

16. Software release content

- i. All software-related issues
 - a) Notification of late-breaking or on-orbit software issues
 - b) Implemented changes (e.g., pre-planned, non-conformance, product improvement, etc.).
 - c) Un-implemented changes (e.g., works-for-me, unexplained anomaly, simulation only, workarounds/user notes, use-as-is, meets-requirement-intent, withdrawn-by-originator, etc.)
- ii. Customer impact category definitions
- iii. Categorization of issues by Customer impact
- iv. Flight rationale, user notes, and workaround method for use as-is issues
- v. Customer Concurrence method

Remarks: The term ‘software development’ is meant to include new development, modification, reuse, re- engineering, maintenance, and all other activities resulting in software products. The information may be provided in one document or separate documents, provided the elements are clearly identified in terms of location, mapping to DRD requirement, and

that the same delivery and approval requirements apply to those documents.

The final plan, as approved, shall be incorporated in the contract as Attachment J-22,
Software Management Plan

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Design, Development, Test, and Evaluation (DDT&E) Plan		
2. DRD No.: USDV-25	3. Data Type: 2	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The DDT&E plan documents the methods, processes, and process controls used to evolve the USDV from design concepts into flight-ready hardware.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OD/ISS Avionics & Software Office ON/USDV Lead Initial Submission: Initial - Submit with Proposal (Contents Items a through j only) Additional Submissions: Update at MCR, Final at SRR, Update at PDR Submission Frequency: The plan shall be reviewed annually for currency and submitted by Sept 30 th , if updates are required to reflect changes to the plan. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this. Update as required to reflect changes that affect DDT&E Plan implementation Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment Interrelationship: SOW: 2.9 <i>Design, Development, Test, and Evaluation (DDT&E)</i> , 3.6 <i>Mission Concept Review (MCR)</i> , 3.7 <i>System Requirements Review (SRR)</i> , 3.9 <i>Preliminary Design Review (PDR)</i> ; DRD: USDV-2, USDV-3 Applicable Documents: SSP 51101, <i>US Deorbit Vehicle Systems Requirements Document (SRD)</i> Scope: The DDT&E Plan documents the contractor's system-level DDT&E methodology and processes, activities needed to develop and prove conformity with the technical specifications, perform design certification, and end item acceptance.		

Contents:

The Contractor's Design, Development, Test, and Evaluation (DDT&E) plan shall contain the following:

- a. Technical Overview, Objectives, and Constraints
- b. Identification of functions necessary for USDV safety and mission success
- c. USDV Design and Development Processes
 1. Design Analysis Cycles (DAC) process, selection of content and incorporation into the overall DDT&E process and critical path management
 2. Process and sequence for design decisions and supporting analysis
- d. Manufacturing planning and approval
- e. Long-lead parts procurement
- f. Supplier management approach identifying major subcontractors, vendors, and partners
- g. Test, Evaluation, and Qualification Processes
- h. Overall USDV System level test program requirements and objectives.
- i. USDV Acceptance Plan and Processes Overview
- j. Approach to the development and acceptance of the USDV System starting at the component level through the USDV System level
- k. System architecture description
 - l. Technology maturation plan Overview
- m. Design trade study process
- n. Identification of major design trade studies
- o. Materials selection
- p. Use of Commercial-Off-The-Shelf (COTS), heritage, and new component designs
- q. Resource allocation mapping
- r. Analysis in support of design verification
- s. Applicable technical plans (e.g., contamination control plan, parts management plan, environments control plan, Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC) control plan, producibility/manufacturability program plan, reliability program plan, quality assurance plan)
- t. Process and timeliness in which NASA is informed of DDT&E content, planning, prioritization, schedule, critical path management, outcomes, results, risks, and mitigations throughout the DDT&E process.

Reference: NESC-RP-06-108, *Design, Development, Test and Evaluation (DDT&E)*

Considerations for Safe and Reliable Human Rated Spacecraft.

Remarks: It is not intended that this plan duplicate other plans called for in other DRDs. This plan shall reference or summarize other plans where appropriate.

The final, as approved, plan shall be incorporated in the contract as Attachment J-23, *Design, Development, Test, and Evaluation (DDT&E) Plan*.

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Verification and Validation (V&V) Plan		
2. DRD No.: USDV-26	3. Data Type: 1	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
<p>10. Description/Use: The V&V Plan documents the Contractor's verification and validation approach, methodology, and processes for NASA USDV requirements (generic term that includes SSP 51101, <i>US Deorbit Vehicle Systems Requirements Document (SRD)</i> and USDV interface requirements (e.g., launch vehicle)).</p> <p>Verification Closure Notice (VCNs) will be used to provide evidence of closure of each NASA USDV requirement. VCN status will be designated as initial, interim (dated), and as final in the closure field.</p>		
<p>11. Distribution:</p> <p>1 electronic copy: Contractor's VCN Repository (VCNs only) 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OD/ISS Avionics & Software Office ON/USDV Lead</p> <p>Initial Submission: Plan: Initial at MCR VCNs: Final continuous until all VCNs are closed by SAR</p> <p>Additional Submissions: Plan: Update at SRR; Update at PDR; Final at CDR; Update at SIR</p> <p>Submission Frequency: Plan: Update as required to reflect changes that affect V&V Plan implementation</p> <p>VCNs: Update as required to reflect changes throughout the VCN life cycle including post-approval changes.</p> <p>Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment</p> <p>Interrelationship: SOW: 2.9.4 <i>Test and Verification (T&V)</i>, 3.6 <i>Mission Concept Review (MCR)</i>, 3.7 <i>System Requirements Review (SRR)</i>, 3.9 <i>Preliminary Design Review (PDR)</i>, 3.10 <i>Critical Design Review (CDR)</i>, 4.2.4 <i>System Integration Review (SIR)</i>, 4.4.5 <i>System Acceptance Review (SAR)</i>; DRD: USDV-3, USDV-5</p>		

Applicable Documents: SSP 51101, *US Deorbit Vehicle Systems Requirements Document (SRD)*, NPR 7150.2D, *NASA Software Engineering Requirements*

Scope: The V&V Plan includes the test, demonstration, analysis, and inspection activities and resulting products required to verify compliance with all NASA USDV requirements and validate the USDV objectives.

The VCNs provide evidence of closure for NASA USDV.

Contents:

1) Validation and Verification (V&V) Plan

The V&V Plan shall include, at a minimum:

- a. Overview of the Contractor verification and validation program (e.g., qualification and acceptance vs. proto-flight, verification and validation of spares, reverification and revalidation plans, and proposed use of prior human spaceflight verification data for unmodified systems used in the same environments).
- b. Description of Contractor's organizational structure for implementing the verification/validation program (e.g., organizations involved in component vs. system tests, review and signoff authority for compliance)
- c. Contractor V&V planning process specific to verification of NASA USDV requirements, including anticipated interaction with NASA (i.e., Contractor involvement with NASA V&V-related meetings to partner verification planning, NASA involvement in Contractor verification event planning, etc.) and launch vehicle provider.
- d. Approach for verifying compliance with NASA USDV requirements (generic term that includes SSP 51101, *US Deorbit Vehicle Systems Requirements Document (SRD)* and USDV interface requirements (e.g., launch vehicle)), including detailed verification methods and objectives and definition of necessary compliance data required for the Verification Closure Notice (VCN).
- e. Verification Planning Matrix that includes for each NASA USDV requirement a description of all associated verification and validation activities (i.e., tests, analyses, inspections, etc.) to be performed based on the identified verification/validation requirements, including as a minimum:
 1. Any prerequisites, constraints, and objectives for all the verification/validation activities.
 2. Summary description of test configurations, analytical model pedigree, etc.
 3. Any associated hazard controls (cross references to Safety Review Process documentation), Interface Control Document (ICDs), Variances, and/or alternative/tailored standards
- f. References to associated verification activity details (test plans, procedures, analytical models, etc.). Verification artifacts to be generated by the associated verification

- activities (test reports, analytical model output, etc.).
- g. Time-correlated sequence of NASA USDV requirements and NASA interface verification and validation activities.
 - h. Detailed time-correlated sequence of verification activities and associated requirement verifications that occur.
 - i. Description and planned usage of the support equipment, software, facilities, and tooling necessary to execute the NASA USDV requirements and NASA interface verification/validation activities.
 - j. Certification plans/processes for all ground support equipment (GSE).
 - k. The identification of any Joint Verification activities between NASA and the Contractor.
 - l. Identification of hardware, software, models, emulators, or simulators needed to verify the USDV system meets all technical requirements.
 - m. References to applicable plans, specifications, procedures, and reports that define the technical aspects of the verification program.
 - n. Any limitations in the ability to verify any performance requirement along with a risk assessment of the limitations in verifying those requirements
 - o. The definition of test and analyses that collectively demonstrate that the hardware complies with the USDV system requirements.
 - p. Description of the Contractor's design change process as it relates to V&V plan updates as well as re-opening previously NASA-approved VCNs.
 - q. Detailed description on Contractor approach to requirements allocation and standards flow-down methodology.
 - r. Description of the Contractor strategy to support Integrated ISS Verification, as applicable, including hardware and software delivery and any support requirements.
 - s. The data and products for V&V of manufacturing operations, hardware and software qualification, acceptance test programs, and environmental testing.
 - t. The Contractor shall propose a final submittal, consistent with the Contractor system development, production, and acceptance lifecycle.
 - u. Approach to provide customer interfaces/related Information Technology (IT) access requirements for NASA personnel to review, provide feedback and approve VCNs.
 - v. Definition of verification methods.
 - w. Validation matrix for all items that require validation. For each validation activity identified (i.e., major test or demonstration event), provide a detailed validation task description including: identification of specific objective, capability, or function being validated, method of validation, measures of performance or effectiveness used for validation, and enabling products and support resources (facilities, models, software, simulators, etc.) required to perform the activity.
 - x. Approach to aligning VCN submittal with project life-cycle reviews (i.e., incremental

submittals, including coordination necessary with NASA V&V related meetings to provide submittal status and resolution of issues.

- y. The approach for making reports made available to NASA upon request with the following roll-up data: VCN number, requirement number, title, subsystem, NASA and Contractor prime Point of Contacts (POCs), closure status, estimated/actual closure date, critical path items, and any NASA assistance needed.
- z. The Software V&V section shall include:
 - 1. General description of the software and software system certification approach and plan.
 - 2. Comply with the *USDV Software Management Plan (DRD USDV-24)* and NPR 7150.2D, *NASA Software Engineering Requirements*
 - 3. V&V organization and management
 - i. Software V&V organizational structure showing responsibility and authority of each unit, and relationships to other organization units outside of Software V&V (e.g., S&MA, Systems Engineering)
 - ii. Identification of the verification products and/or activities each unit is responsible for
 - iii. Software V&V Work Breakdown Structure (WBS)
 - 4. Procedures planned by Computer Software Configuration Items (CSCI) for development and execution
 - 5. Procedure coverage approach for:
 - i. Software requirements
 - ii. Data items/elements as defined in a data dictionary, Interface Requirements Documents (IRD), or ICDs
 - iii. External and internal interfaces, including the integrated vehicle systems (complete complement of CSCIs and components)
 - iv. Verification of timing-dependent software functionality such as system operation in defined mission sequences using mission phases, mode, and/or state machine transitions (internal and external)
 - 6. Schedules, including:
 - i. Procedure development, procedure tests, and dry-runs
 - ii. Procedure execution for software certification
 - iii. Software V&V Test Environment/Facility development and deployment
 - 7. In-test and post-test data recording, data reduction, and results analysis
 - 8. Software V&V Test Environment/Facility site plan, including:
 - i. Site development

- ii. Fidelity of software and hardware simulations, emulators, and test beds
 - iii. Site certification
9. Location of and accessibility to V&V results, analyses, documentation, and records
 10. Corrective action document location and accessibility

2) Verification Closure Notices

The Contractor shall submit a VCN that provides verification evidence for each NASA USDV requirements (SSP 51101, *US Deorbit Vehicle Systems Requirements Document (SRD)*) and USDV interface requirements (e.g., launch vehicle) in accordance with the approved V&V plan.

For each VCN, the Contractor shall provide data for the following areas:

- a. One VCN per requirement shall be submitted in this DRD. Final submittals against a specific requirement shall be made only after dependent verifications are completed and submitted. Partial early submission is encouraged, and the Contractor shall identify open work associated with the verification activity and identify as interim (dated) submittal in the VCN.
- b. VCN closure rationale shall provide specific description and/or reference to specific evidence to verify and validate compliance to the requirement. Each VCN shall have a unique identifier associated with each “shall” statement in the SSP 51101, *US Deorbit Vehicle Systems Requirements Document (SRD)* requirement it closes. Also, each VCN shall include the requirement statement, and associated V&V Plan method, objectives, and success criteria. The detailed verification methods for the VCN (Analysis, Inspection, Test, or Demonstration) shall be identified on the VCN. The decomposition and interdependencies of the V&V objectives with success criteria shall be identified.
- c. Flow down of requirements to indentured product baseline shall be identified, where applicable. These lower-level requirements shall be identified with associated closure verification. VCN closure is not complete until the lower-level requirements are satisfied.
- d. The evidence submitted with the VCN for final approval shall include analysis, test reports, demonstration reports, or inspection results with a concise summary. The evidence shall point to the location of clear evidence for verifying the requirement. All evidence shall be delivered as attachment to the VCN (.pdf, .docx, .xlsx, NX, or Standard for the Exchange of Product Data (STEP)). Any associated reference or supporting data shall be made available to NASA during the contract period of performance.
- e. Production and operational verifications associated with recurring verification activities, including acceptance testing, shall include reference to the released procedure or constraint.
- f. Waivers, Deviations, and Exceptions to the requirement shall be identified in the VCN, and NASA should be notified as early as possible.

- g. Description of deviations from nominal results, failures, approved corrective actions and procedures and retest.
- h. Identification of test configuration and any differences from the flight configuration.
- i. Traceability back to the requirement and/or verification/validation success criteria.
- j. Models used in analysis.
- k. VCN status shall be designated as initial, interim (dated), and as final in the closure field.
- l. Signature blocks for the Contractor and NASA shall be included.

VCNs may be processed and stored in the Contractor's data system if NASA and its support contractors have access to review supporting data, approve the VCNs, and produce reports with the following data listing: VCN number, requirement number, title, subsystem, and closure status/completion date.

The implementation approach for VCNs should be consistent with the *Insight Management Plan (DRD USDV-5)*.

Reports shall be made available to NASA upon request with the following roll-up data: VCN number, requirement number, title, subsystem, NASA and Contractor prime POCs, closure status, estimated/actual closure date, critical path items, and any NASA assistance needed.

Prior to System Acceptance Review (SAR) closeout, all VCNs must have NASA approval.

Additionally, all verification evidence within HRs (based on NASA system requirements or derived by the safety process) have been reviewed by the ISRP prior to Phase III completion.

Remarks: It is not intended that this plan duplicate other plans called for in other DRDs. This plan shall reference or summarize other plans where appropriate.

The final, as approved, plan shall be incorporated in the contract as Attachment J-24, *Verification and Validation (V&V) Plan*.

The primary delivery of the VCNs is to the Contractor's VCN electronic repository. Once the Contractor has completed delivery of the VCN to the Contractor VCN electronic repository, the contractor shall submit an EDMS Delivery Notice with an official transmittal letter notification to document time, date, and location the VCNs were delivered to for the official contract record of completion.

Maintenance: For the V&V Plan only - DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: System Engineering Management Plan (SEMP)		
2. DRD No.: USDV-27	3. Data Type: 2	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The SEMP defines the Contractor's approach to technically managing the engineering and integration processes and products throughout the project life cycles and successful completion of the contract.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR ON/USDV Lead Initial Submission: Initial at Contract Start + 30 calendar days Additional Submissions: Final at MCR; Update at SRR Submission Frequency: The plan shall be reviewed annually for currency and submitted by Sept 30 th , if updates are required to reflect changes to the plan. If no changes to the plan are required, the Contractor shall submit an EDMS Delivery Notice indicating this. Update as required to reflect changes that affect SEMP implementation Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment Interrelationship: SOW: 3.6 <i>Mission Concept Review (MCR)</i> , 3.7 <i>System Requirements Review (SRR)</i> ; DRD: USDV-1, USDV-3 Applicable Documents: N/A Scope: The SEMP defines the approach, methodology, and application to technically managing the system engineering and integration processes and products throughout the project life cycles and successful completion of the contract. It also includes a description of the process and tools used.		

Contents: The Contractor's plan shall describe the system engineering process and products generated that describe the technical management. The plan shall include:

- a. Describe the Contractor Systems Engineering processes and tools used to implement the technical effort and document the overall technical approach, maintain integrity between NASA and Contractor requirements to the Contractor verification plans, and to transition the products through the lifecycle, including, at a minimum:
 1. Describe the overall lifecycle.
 2. Describe the Contractor's system engineering process, including flow down to subcontracts.
 3. Describe the trade study methodology.
 4. Describe the scope, approach, methods, and procedures of the system used to implement the management of requirements and verification tracking.
 5. Describe how requirements are validated, and updated requirements reviewed and approved.
 6. Describe the process for critical path management. This should include required analysis, test, or demonstration scheduling activities (either required or derived by the safety process) and activities that have dependencies.
 7. Describe the evaluation and decision-making process to be used by the Contractor when resolving technical questions.
 8. Provide implementation approach and plans for NASA Mission Systems integration.
 9. Provide implementation approach and plans for Launch Vehicle (LV) integration.
 10. Describe the process for analyzing and defining USDV requirements as part of their functional derivation, definition, and allocation of Contractor specification requirements.
- b. Describe the anticipated interactions, roles, and responsibilities between the contractor and government system engineering teams throughout the technical effort.
- c. Identify and describe the requirement development processes, proposed documentation, and management of the process, including the incorporation of the NASA unique requirements as well as interfaces to other systems.
- d. Describe the tools, methodologies, and approach used to develop and manage to the design solution. Include trade studies processes and documentation.
- e. Describe the milestone and gate review process for design, development, testing, and evaluation.
- f. Describe the roles and responsibility related to technical authority/accountability. Including the interrelation between Contractor's technical and business management.
- g. Describe the process and philosophy for technical decision making including dissenting opinions and review board processes including NASA role and interfaces.

Remarks: The Contractor is encouraged to make use of existing standardized plans, procedures, and related products that meet the intent of this DRD. It is permissible to use multiple contractor standard plans and procedures to meet the intent of this DRD (rather than creating a single document).

The final plan, as approved, shall be incorporated in the contract as Attachment J-25, *Systems Engineering Management Plan (SEMP)*.

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Imagery Plan		
2. DRD No.: USDV-28	3. Data Type: Plan: 2 Imagery: 3	4. OPR: OC
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
<p>10. Description/Use:</p> <p>To define the approach and strategy for the imagery documentation (still photo, motion picture, digital imagery, or video) of the configuration of the USDV spacecraft, systems, subsystems, and components during manufacture, testing, assembly, integration, and closeout. The imagery will be used to support on-orbit anomaly response, configuration verification, post-launch evaluation, anomaly analysis, sustaining engineering, and hardware reconfiguration.</p>		
<p>11. Distribution:</p> <p>1 electronic copy (Imagery Products and Catalog): Multimedia File Transfer per SSP 50502, Section 6.0, <i>International Space Station Hardware Preflight Imagery Requirements</i></p> <p>1 electronic copy (Pre-flight Imagery Plan): ISS Program Authorized Repository Program Authorized Repository Upload Notification:</p> <p style="padding-left: 40px;">Contractor's CO BG/CO OA/COR and Alternate COR OC/Mission Integration & Operations Office ON/USDV Lead</p> <p>For each imagery product and catalog submittal to Multimedia File Transfer per SSP 50502, <i>International Space Station Hardware Preflight Imagery Requirements</i>, the Contractor shall submit an EDMS Delivery Notice with an official transmittal letter notification to document time, date, content, number of images, and location the imagery products were delivered to for the official contract record of completion.</p> <p>Initial Submission: Initial – PDR</p> <p>Additional Submissions: Final – CDR</p> <p>Submission Frequency: Per the approved Pre-Flight Imagery Plan (PFIP)</p> <p>Imagery Products and Catalog: The imagery and cataloging data shall be delivered monthly or upon accumulation of 150 images from the start of imaging until launch.</p> <p>Format: As defined in SSP 50502, <i>International Space Station Hardware Preflight Imagery</i></p>		

Requirements.

Interrelationship: SOW: 3.9 *Preliminary Design Review (PDR)*, 3.10 *Critical Design Review (CDR)*; DRD: USDV-3

Applicable Documents: SSP 50502, *International Space Station Hardware Preflight Imagery Requirements*, NASA-STD-2822, *Still and Motion Imagery Metadata Standard*, NASA-STD-2818, *Digital Television Standards for NASA*

Scope: The USDV Imagery Plan shall define the approach and strategy for documenting of the USDV spacecraft system, subsystems, components, and ground support equipment during manufacturing, assembly, test, integration, and ground operations through launch

Contents:**PREFLIGHT IMAGERY PLAN (PFIP)**

A Contractor-provided PFIP shall be submitted to NASA for review and approval by the ISS/Imagery Working Group (IWG). The imagery plan shall specify the imagery to be captured by the Contractor in accordance with SSP 50502, *International Space Station Hardware Preflight Imagery Requirements*.

In addition, the Contractor's PFIP shall include the following imagery which the Contractor shall provide:

- For the USDV System, the Contractor shall provide the imagery listed in SSP 50502, *International Space Station Hardware Preflight Imagery Requirements*, Section 4.2 *ISS Modules and Elements*, paragraphs A- K,
- For the USDV subsystems and components, the Contractor shall provide imagery listed in SSP 50502, *International Space Station Hardware Preflight Imagery Requirements*, Section 4.3 *System Hardware*, paragraphs A-N
- The Contractor shall provide imagery for Hardware Imagery taken and provided real-time during test, qualification, production and build-up, assembly and delivery of end items and subassemblies during the manufacturing, assembly, test, integration, and close-out to document the hardware configuration and condition and to assist in training and anomaly investigation.
- The Contractor shall provide imagery for all flight support equipment and ground support equipment attach points, connectors, and interfaces shall be imaged before, during, and after integration.
- All hardware modifications that affect form, fit, or function.
- All NASA and its support service Contractor imagery requested through all phases of the USDV contract.

The Contractor shall provide all Contractor inflight imagery requirements to NASA for the increment specific Increment Definition and Requirements Document, Annex 3: Imagery Requirements in accordance with the established Multilateral Imagery Working Group

process.

The PFIP shall specify the timeline of the Contractor acquired imagery availability to NASA for viewing. To make imagery available to NASA as soon as possible, the Contractor shall post all imagery within 5 working days of an image's acquisition.

IMAGERY SUBMITTALS

Imagery submittals shall be in accordance with SSP 50502, *International Space Station Hardware Preflight Imagery Requirements*.

The Contractor shall notify NASA users when the USDV imagery and catalog has been delivered; provide a description of the updated imagery; and location of the imagery.

Remarks: Types of imagery includes, but is not limited to, photography, video, radiographic, and thermographic images.

Maintenance: N/A

1. DRD Title: USDV Transportation and Logistics Requirements Plan		
2. DRD No.: USDV-29	3. Data Type: 1	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
<p>10. Description/Use: Defines the contractor's approach to meet the requirements for USDV transportation and logistics to maintain the integrity, reliability, and damage-free delivery of the USDV.</p> <p>The plan shall cover the contractor's approach regarding the packaging, handling, and transportation of the USDV, flight hardware, and Ground Support Equipment.</p>		
<p>11. Distribution:</p> <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR ON/USDV Lead</p> <p>Initial Submission: Initial at PDR</p> <p>Additional Submissions: Final at CDR</p> <p>Submission Frequency: Update as required to reflect changes that affect USDV Transportation and Logistics Requirements Plan implementation</p> <p>Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment</p> <p>Interrelationship: SOW: 2.1 <i>Program Management</i>, 3.9 <i>Preliminary Design Review (PDR)</i>, 3.10 <i>Critical Design Review (CDR)</i>, 4.5.1 <i>Shipment to Acceptance Destination</i>, 5.0 <i>Dwell (CLIN 3)</i>; DRD: USDV-3, USDV-30, Clause L.1.II 1852.211-70, <i>Packaging, Handling, and Transportation</i></p> <p>Applicable Documents: NPR 6000.1, <i>Requirements for Packaging, Handling, and Transportation for Aeronautical and Space Systems, Equipment, and Associated Components</i></p> <p>Scope:</p> <p>The plan shall cover the contractor's approach to defining requirements regarding the packaging, handling, and transportation of the USDV, flight hardware, and Ground Support Equipment (GSE).</p>		

Contents:

The USDV Transportation and Logistics Requirements Plan shall include as a minimum the following elements:

- a. The plan for packaging, handling, and transportation of the USDV, flight hardware, and ground support equipment (GSE) in accordance with NPR 6000.1, *Requirements for Packaging, Handling, and Transportation for Aeronautical and Space Systems, Equipment, and Associated Components*.
 1. Organization and responsibilities
 2. Requirement and process for training and certification of handling/moving personnel.
 3. Designated points of contact for these functions.
 4. Process for developing the special moving/handling procedures, review, approval, and implementation for each program critical hardware (PCH) item
 5. Method to ensure that all support and handling/moving equipment meets current safety and industry certification
 6. List of items designated as PCH and the locations where these items are to be moved/handled
 7. Detailed procedures required for each item designated as PCH for each handling and moving operation
 8. Designation of responsible organizations for handling each PCH item, its approximate weight, methods for handling, and any handling or moving constraints.
 9. Safety and preventive maintenance instructions for each PCH item.
 10. Details of periodic storage inspection processes required to ensure that the stored articles meet the requirements for storage as outlined in the procedures.
- b. The approach to define requirements necessary for the packaging, handling, and transportation of the USDV, flight hardware, and GSE.
- c. The approach to inspections and check-outs of the USDV, flight hardware, and GSE post shipping.
- d. Design interface, to include supportability management and interface with other disciplines, such as reliability maintainability, and design engineering
- e. Maintenance and support concept:
 1. Maintenance levels and maintenance sites
 2. Maintenance functions per level
 3. Maintenance environment (i.e., organization and resources available at each level/site)
 4. Repair/sparing policy

5. Maintenance item and line replaceable unit selection criteria
6. Storage requirements (long and short term, if different)
- f. Support and test equipment plan
- g. Logistics Product Data plan for acquisition, generation, use, storage, management, update, and distribution of Logistics Support Analysis (LSA) data.
- h. Obsolescence/diminishing manufacturing and material shortage (DMSMS) plan.

Remarks: N/A

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: USDV Spacecraft Readiness Plan		
2. DRD No.: USDV-30	3. Data Type: 1	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
<p>10. Description/Use: The USDV Spacecraft Readiness Plan defines the contractor's approach to storing and maintaining the USDV in a state of readiness for the period between SAR and PSR prior to shipment to the Launch Site Payload Processing Facility (PPF). This plan shall cover the contractor's activities and processes for meeting NASA's requirements to store and maintain the USDV in a state of readiness and maintain personnel readiness to meet NASA's timeline for launch after call-up.</p>		
<p>11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR ON/USDV Lead</p> <p>Initial Submission: Initial at MCR</p> <p>Additional Submissions: Final at PDR; Update at CDR; Update at SAR</p> <p>Submission Frequency: Update as required to reflect changes that affect USDV Spacecraft Readiness Plan implementation</p> <p>Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment</p> <p>Interrelationship: SOW: 3.6 <i>Mission Concept Review (MCR)</i>, 3.9 <i>Preliminary Design Review (PDR)</i>, 3.10 <i>Critical Design Review (CDR)</i>, 4.4.5 <i>System Acceptance Review (SAR)</i>, 5.0 <i>Dwell (CLIN 3)</i>; DRD: USDV-2, USDV-3, USDV-20, USDV-29</p> <p>Applicable Documents: ISO 14644-1, <i>Cleanrooms and Associated Controlled Environments, Part 1: Classification of air cleanliness by particle concentration</i>, AS9100, <i>Quality Management Systems –Requirements for Aviation, Space, and Defense Organizations</i></p> <p>Scope: The USDV Spacecraft Readiness Plan defines the contractor's approach to storing and maintaining the USDV in a state of readiness for the period between SAR and PSR prior to shipment to the LS PPF.</p>		

Contents:

The contractor's plan shall describe the facility to be used and define the end-to-end operations during execution of CLIN 3 Dwell for the period between System Acceptance Review (SAR) and shipment to the Launch Site Payload Processing Facility (LS PPF).

a. Facility and ground support equipment (GSE)

1. The contractor shall provide an overview of the facility to be used during the Dwell period including details on how the facility will be secured and bonded, control access, and the process for allowing access by NASA personnel.
2. The contractor shall describe how it will comply with all USDV procedures and standards for quality control in accordance with the *Safety and Mission Assurance (S&MA) Plan (DRD USDV-20)*.
3. The contractor shall provide details on how they will satisfy the requirements set forth in AS9100, *Quality Management Systems –Requirements for Aviation, Space, and Defense Organizations* including inventory control validation and record keeping during the dwell period.
4. The contractor shall describe the process for maintaining all contractor facilities used for processing of flight hardware in an ISO Class 8 clean room in accordance with ISO 14644-1, *Cleanrooms and Associated Controlled Environments, Part 1: Classification of air cleanliness by particle concentration*.
5. The contractor shall identify all GSE required for the USDV dwell period including any required maintenance on the GSE and identification of any GSE that will be transferred to the LS PPF.

b. Maintenance, Anomalies, Non-Conformances, Modifications, and Reverification

1. The contractor shall identify all standard or routine preventative maintenance required to keep the USDV in compliance with the accepted configuration from SAR and maintain a state of readiness to support mission call-up including:
 - i. Description and frequency of maintenance
 - ii. Plan for overall health and status monitoring
 - iii. Any required testing and/or inspection
 - iv. Identification, tracking, and/or replacement of limited life items
 - v. Battery health status, maintenance, and charging schedules
2. The contractor shall describe the process for reporting any required corrective maintenance including reverification activities.
3. The contractor shall describe their process for reporting, tracking, and resolving issues, anomalies, and non-conformances, including adjudication at a Material Review Board (MRB) co-chaired by NASA, if applicable.

4. The contractor shall define the process for performing modifications to hardware and software post-SAR.
 5. The contractor shall describe their plan for reverification activities (i.e., testing or inspection) and updates to data deliveries (e.g., Verification Closure Notices (VCNs), Data Requirements Description (DRDs), Hazard Reports (HRs), Data Item Description (DIDs)) of any repaired components, components that have had maintenance, or changes made to the accepted vehicle post SAR.
- c. Team Proficiency
1. The contractor shall describe the plan for maintaining team proficiency and currency of the operations and sustaining engineering teams
- d. Road-to Shipment to LS PPF
1. The contractor's plan shall define the work required and schedule for final preparations of the USDV from notification of mission call-up to readiness for shipment to the LS PPF. This shall include a plan for closing out all open work, anomalies, non-conformance, scheduled preventative maintenance, limited life item status, software reverification, etc.
 2. The contractor's plan shall describe the plan for re-activation and checkout to ensure all systems are functioning as designed.
 3. The contractor's plan shall identify any known open verifications that will be closed during or after the launch vehicle integration process.
 4. The contractor's plan shall identify key tasks and key decision points required for USDV readiness to ship to launch site.

Remarks: The Contractor is encouraged to make use of existing standardized plans, procedures, and related products that meet the intent of this DRD. It is permissible to use multiple contractor standard plans and procedures to meet the intent of this DRD (rather than creating a single document).

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Data Input for NASA Independent Verification and Validation (IV&V) and NASA Integration		
2. DRD No.: USDV-31	3. Data Type: 3	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: N/A	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: Establishes data required for NASA to perform its own IV&V of select analyses used for verification of applicable requirements. Also establishes data required by NASA to perform ISS integration and stage verification activities		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR ON/USDV Lead Initial Submission: Initial at PDR Additional Submissions: Final at CDR Submission Frequency: Update as required to reflect changes that affect delivery of data inputs to NASA for NASA Integration and IV&V efforts Format: Includes: Contractor's format, source code files, configuration data, and inputs and outputs of test cases inputs in ASCII format; technical description document in contractors' format Interrelationship: SOW: 2.10 <i>Software Management</i> , 3.9 <i>Preliminary Design Review (PDR)</i> , 3.10 <i>Critical Design Review (CDR)</i> ; DRD: USDV-3 Applicable Documents: SSP 51105, <i>US Deorbit Vehicle Integration Plan</i> , SSP 51101, <i>US Deorbit Vehicle Systems Requirements Document (SRD)</i> Scope: NASA will perform its own independent IV&V activities to assess adequacy and robustness of Contractor's design. This is in addition to the Contractor's third-party IV&V requirements levied in the USDV contract. NASA will also perform ISS integration and stage verification activities. The Contractor shall provide software, hardware, data, and subject matter expertise to NASA to support both NASA efforts.		

Contents:

The Contractor shall provide the data, documentation, drawings, analytical models, and subject matter expertise required for NASA to perform its own Independent Verification and Validation (IV&V) activities.

The Contractor shall provide the data, documentation, drawings, analytical models, and subject matter expertise required for NASA to perform ISS integration and stage verification.

Multiple deliveries may be required during design and development, and the deliveries may be independent of major milestones and reviews. The deliveries support Government analytical tool development and performance analyses for ISS integration, stage verification as well as NASA's own IV&V activities. In the event the Contractor has data that is applicable to more than one area listed, the Contractor may combine the data in one delivery and shall specify which areas the data applies to.

Specifically, the Contractor shall provide software, hardware, data, and subject matter expertise for the following areas:

- a. ISS Integration and Stage Verification
- b. Flight Mechanics and Guidance Navigation and Control (GNC)
- c. Loads and Structural Dynamics
- d. Software
- e. Propulsion

Final DRD submission shall be coordinated with NASA.

Remarks: N/A

Maintenance: N/A

1. DRD Title: Assembly, Integration, and Test (AI&T) Plan		
2. DRD No.: USDV-32	3. Data Type: 1	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The AI&T Plan documents the contractor's system-level AI&T methodology and processes. It also documents the detailed AI&T activities needed to prove conformity with the technical specifications and perform design certification and end-item acceptance.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OD/ISS Avionics & Software Office ON/USDV Lead Initial Submission: Initial at SRR Additional Submissions: Final at PDR; Update at CDR; Update at SIR Submission Frequency: Updates as required to reflect changes that affect AI&T Plan implementation Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment Interrelationship: SOW: 3.7 <i>System Requirements Review (SRR)</i> , 3.9 <i>Preliminary Design Review (PDR)</i> , 4.2.4 <i>System Integration Review (SIR)</i> ; DRD: USDV-2, USDV-3 Applicable Documents: SSP 51101, <i>US Deorbit Vehicle Systems Requirements Document (SRD)</i> Scope: The AI&T Plan addresses the overall assembly, integration, and test program for the USDV. The plan addressed flight hardware, personnel, and facilities that will be involved in the effort. Contents: The Contractor's plan shall contain, at a minimum the following:		

- a. Overall USDV System Level Test Program
- b. Description of the individual tests to be performed, their configuration (including ground systems and interfaces), test objectives to include verification requirements, support equipment, special equipment, and requirements addressed by the test (including SSP 51101, *US Deorbit Vehicle Systems Requirements Document (SRD)*).
- c. Flight hardware contamination and environmental control requirements and implementation.
- d. Flight hardware security requirements and implementation.
- e. Requirements for handling deviations, exceptions, omissions, and discrepancies during tests.
- f. Listing of additional plans and procedures to be written in support of this plan for all contractor- defined key system and subsystem level tests, including but not limited to the following:
 1. Vibration/Acoustic
 2. Thermal Vacuum
 3. Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC)
 4. Power Quality
 5. System Level End-to-End Validation (Ground to USDV, Comm links)
 6. Functional
- g. Transportation plan for all flight hardware moves.
- h. Plan for control of Flight System configuration during Assembly, Integration, and Test (AI&T).
- i. Use of quality assurance.
- j. Control and archival of controlled records (including as-run test procedures and data)
- k. Test schedule, planned test reviews and documentation
- l. Network schedule including integration of flight subsystem feeder schedules (including government furnished equipment).
- m. Identification of receivables and deliverables for all flight hardware, flight software, flight sequences, ground support equipment, and documentation (baseline).
- n. Integration, Test, and Handling constraints.
- o. Identification of Risks and associated mitigations.
- p. Plans for testing: (1) critical sequences (e.g., Launch & Orbit Insertion, etc., if applicable) (2) significant flight sequences and (3) mission scenarios using the Flight Test Bed(s) and the Flight System.
- q. Identification of NASA provided ground support equipment (GSE) (mechanical, electrical) and software needed to verify that the flight system meets all technical

requirements.

- r. Identification of Government provided facilities or support needed to verify that the flight system meets all technical requirements.
- s. Plans for assembly and integration of the USDV, including activities leading up to launch. The plan shall include the final integration at the launch provider site, including any integration and testing required.

Remarks: The Contractor is encouraged to make use of existing standardized plans, procedures and related products that meet the intent of this DRD. It is permissible to use multiple contractor standard plans and procedures to meet the intent of this DRD (rather than creating a single document).

The final, as approved, plan shall be incorporated in the contract as Attachment J-26, *Assembly, Integration, and Test (AI&T) Plan*.

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: NASA Standards and Specifications Compliance and Tailoring		
2. DRD No.: USDV-33	3. Data Type: 1	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: <p>The Contractor shall identify the standards and specifications used for the development of the USDV, the corresponding equivalency of these standards and specifications relative to meeting or exceeding a NASA-provided reference-set of design and construction standards, and the data required for understanding and assessing the risk associated with the use of non-equivalent industry standards and specifications.</p>		
11. Distribution: <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OD/ISS Avionics & Software Office ON/USDV Lead</p> <p>Initial Submission: Initial (Content Item numbers a through e only) submitted with proposal (Table DRD USDV-33-1 completed to identify the Contractor's proposed compliance and tailoring to NASA standards and specifications)</p> <p>Additional Submissions: Update at MCR; Final at PDR.</p> <p>Submission Frequency: Update as required to reflect proposed changes to NASA Standards and Specification Compliance and Tailoring</p> <p>Format: Content Item numbers a through e shall be in Microsoft Word or Excel format. The Contractor's format is acceptable for delivery of standards and additional requested data.</p> <p>Interrelationship: SOW: 2.9.1 <i>Design and Construction Standards</i>, 3.6 <i>Mission Concept Review (MCR)</i>, 3.9 <i>Preliminary Design Review (PDR)</i>; DRD: USDV-3</p> <p>Applicable Documents: SSP 51101, <i>US Deorbit Vehicle Systems Requirements Document (SRD)</i></p> <p>Scope: Provide a description of the approach to the identification and application of design and construction standards and specifications to be used for the development of the USDV.</p>		

Contents:

Specific content includes:

- a. The Contractor shall identify in *Table DRD USDV 33-1* the desired method of addressing each standard listed in *Table DRD USDV-33-2*. Either meeting the NASA referenced standard as listed or use of a proposed alternate standard relative to meeting or exceeding one of the NASA standards, and then provide the proposed alternate standard, specification, approach, and justification that the Contractor proposes to follow instead. *Table DRD USDV-33-1* of this DRD needs to be completed to define the accepted Government and proposed Contractor standards and specifications to be applied to the development of the USDV.
- b. A summary of the Contractor's design and construction standards and specification philosophy to include the following: descriptions of the heritage of the standards and specifications the Contractor uses; the process of adopting and/or tailoring government and industry standards for Contractor usage; and the process for creating and maintaining internal company standards.
- c. A description of the Contractor's technical decision-making process describing the review and approval process and level of authority required for deviations and waivers against the Contractor's applicable design and construction standards and specifications.
- d. An assessment of the equivalency of the Contractor's application of design and construction standards to meet or exceed the NASA standards in *Table DRD USDV-33-2, Reference List of NASA Design and Construction Standards and Specifications*.
- e. For each standard, justification for the suitability of using alternate standards and specifications to meet or exceed the NASA standard including relevant data on past usage and other supplemental information that allows NASA to adequately assess the risk associated with their usage. To further assist NASA's risk assessment, the Contractor shall identify when use of alternate standards and specifications will enable the Contractor to use flight-proven components and subsystems in the USDV design and provide associated rationale.
- f. Copies of the Contractor's design and construction standards and specifications not found in the public domain, even if not listed in *Table DRD USDV-33-2, Reference List of NASA Design and Construction Standards and Specifications*, shall be provided electronically.
- g. With the final submittal, identify and provide all deviations and waivers against the Contractor's applicable design and construction standards.

After Preliminary Design Review (PDR), all deviations and waivers and/or proposed updates are required to be submitted within 30 calendar days of identification by the Contractor, as a formal DRD re-submit, per Maintenance requirements listed below.

Remarks: The final, as approved, Contents items a through e shall be incorporated in the contract as Attachment J-27, *NASA Standards and Specifications Compliance and Tailoring Approach*.

Maintenance: Updates to this document shall be incorporated by resubmission of the document after coordination with the ON/USDV Technical Lead. Changes shall be incorporated by complete reissue with a change log in the front matter of the document.

TABLE DRD USDV-33-1 SUMMARY OF DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS

Document Number/Unique Identifier	Document Title	Applicable Version or Release Data	Identify the subject area that the standard or specification applies	Contractor acceptance of NASA standard or proposed alternate standard and justification of suitability

**TABLE DRD USDV-33-2 APPLICABLE LIST OF NASA
DESIGN AND CONSTRUCTION STANDARDS AND
SPECIFICATIONS**

Document Number	Document Revision	Document Title
ANSI ESD S20.20-2021	Edition 2021	Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initially Explosive Devices)
ANSI Z136.1-2022	2022	The American National Standard for Safe Use of Lasers
AS 9100	Rev D September 2016	Quality Management Systems - Requirements for Aviation, Space, and Defense Organizations
ASTM Manual 36	2nd edition	Safe Use of Oxygen and Oxygen Systems: Handbook for Design, Operation, and Maintenance: Second Edition
FIPS Pub 140-2, Changes 1-4	December 2002	Security Requirements for Cryptographic Modules
FIPS Pub 140-3	March 2019	Security Requirements for Cryptographic Modules
FIPS Pub 197	Updated May 2023	Advanced Encryption Standard (AES)
GEIA-STD-0005-2	Rev. A May 2012	Standard for Mitigating the Effects of Tin Whiskers in Aerospace and High Performance Electronics
IPC-2220 series per Performance Class 3.	Fully Applicable per Performance Class 3. 2221: B 2222: B 2223: E 2225: B/L 2226: A 2228: B/L	Family of Printed Board Design Documents
IPC-2221	Rev. B 2012	Generic Standard on Printed Board Design
IPC-2222	Rev. B 2020	Sectional Design Standard for Rigid Organic Printed Boards
IPC-6010 Series	Fully Applicable 6011: B/L 6012: ES 6013: E 6015: B/L	Family of Printed Board Performance Documents

	6017: A 6018: DS	
IPC-6011	Rev. Baseline 1996	Generic Performance Specification for Printed Boards
IPC-6012	Rev. ES 2020	Quality and Performance Specification for Rigid Printed Boards
IPC-CM-770	Rev. E January 2004	Component Mounting Guidelines For Printed Boards
IPC-J-STD-001HS	2021	Space And Military Applications Electronic Hardware Addendum To IPC J-STD-001H Requirements For Soldered Electrical And Electronic Assemblies
ISO 14644-1:2015	2nd Edition December 2015	Cleanrooms and Associated Controlled Environments, Part 1: Classification of air cleanliness by particle concentration.
JSC 20793	Rev. D March 2017	Crewed Space Vehicle Battery Safety Requirements
JSC 62809	Rev. E June 22, 2022	Human Rated Spacecraft Pyrotechnic Specification
JSC 65795	Rev. M 2022	NASA Docking System (NDS) Interface Definition Document (IDD)
JSC 65828	Rev. B w/ Change 1 July 15, 2014	Structural Design Requirements and Factors of Safety for Spaceflight Hardware
JSC 66617	Initial Release September 2013	ISS Passive Thermal Control System (PTCS) Analysis Guide
JSC 67035	Rev. A August 2017	Best Practices and Guidelines (BP&G) for Thin Wall Pressure Boundaries (TWPB) for Human Spaceflight Applications
MIL-PRF-38534	Rev L December 2019	Hybrid Microcircuits, General Specification for
MIL-PRF-38535	Rev M November 2022	Integrated Circuits (Microcircuits) Manufacturing, General Specification for
MIL-STD-1553	Rev B Notice 2 September 8, 1986	Digital Time Division Command/Response Multiplex Data Bus
MSFC-SPEC-3746	Baseline April 16, 2020	Flow-Induced Vibration Assessment Requirements for Metal Bellows and Flex hoses

NASA-STD-4005	Rev. A w/CHANGE 1 November 17, 2021	Low Earth Orbit Spacecraft Charging Design Standard
NASA-STD-5012	Rev. B June 16, 2016	Strength and Life Assessment Requirements for Liquid-Fueled Space Propulsion System Engine
NASA-STD-5017	Rev. B December 6, 2022	Design and Development Requirements for Mechanisms
NASA-STD-5019	Rev. A w/ Change 3 August 14, 2020	Fracture Control Requirements for Spaceflight Hardware
NASA-STD-5020	Rev. B August 6, 2021	Requirements for Threaded Fastening Systems in Spaceflight Hardware
NASA-STD-6016	Rev. C September 30, 2021	Standard Materials and Processes Requirements for Spacecraft
NASA-STD-7009	Rev. A w/ Change 1 December 7, 2016	Standard for Models and Simulations
NASA-STD-7012	Rev. A February 22, 2023	Leak Test Requirements
NASA-STD-8719.14	Rev. C November 5, 2021	Process for Limiting Orbital Debris
NASA-STD-8739.1	Rev. B w/change 2 October 2021	Workmanship Standard for Polymeric Application on Electronic Assemblies
NASA-STD-8739.4	Rev. A w/change 4 April 2022	Workmanship Standard for Crimping, Interconnecting Cables, Harnesses, and Wiring
NASA-STD-8739.5	Rev. A w/change 2 October 2021	Workmanship Standard for Fiber Optic Terminations, Cable Assemblies, and Installation
NASA-STD-8739.6	Rev. B February 4, 2021	Implementation Requirements for NASA Approved Workmanship Standards
NASA-STD-8739.8	Rev B September 2022	Software Assurance and Software Safety
NASA/TM-2020-220555	January 2020	NASA Meteoroid Engineering Model (MEM) Version 3 (User Guide)
NASA/TP-2019-220448	December 2019	NASA Orbital Debris Engineering Model ORDEM 3.1 – Software User Guide
NIST SP 800-57	Part 1: Rev 5 May 2020 Part 2: Rev 1 May 2019	Recommendation for Key Management – Part 1: General and Part 2: Best Practices for Key Management Organizations
NPR 7150.2	Rev. D March 8, 2022	NASA Software Engineering Requirements

SAE-AS-7928	Rev. C May 2019	Terminals, Lug: Splices, Conductor: Crimp Style, Copper, General Specification for
SMC-S-016	September 5, 2014	Test Requirements for Launch, Upper-Stage and Space Vehicles
SN-C-0005	Rev. D July 20, 1998	Space Shuttle Contamination Control Requirements
SSP 30219	Rev. K March 17, 2021	Space Station Reference Coordinate Systems
SSP 30237	Rev. T January 17, 2012 w/errata August 28, 2018	Space Station Electromagnetic Emission and Susceptibility Requirements
SSP 30240	Rev. H September 25, 2010	Space Station Grounding Requirements
SSP 30242	Rev. K December 13, 2011	Space Station Cable/Wire Design and Control Requirements for Electromagnetic Compatibility
SSP 30243	Rev. N December 13, 2011	Space Station Requirements for Electromagnetic Compatibility
SSP 30245	Rev. P January 17, 2012	Space Station Electrical Bonding Requirements
SSP 30309	Rev. F October 23, 2009 w/ errata August 13, 2018	Safety Analysis and Risk Assessment Requirements Document
SSP 30312	Rev. L October 22, 2014	Electrical, Electronic and Electromechanical (EEE) and Mechanical Parts Management and Implementation Plan for Space Station Program, Volume I
SSP 30423	Rev. L October 27, 2014	Space Station Approved Electrical, Electronic, and Electromechanical (EEE) Parts list
SSP 30425	Rev. B May 11, 1994 w/errata October 6, 2020	Space Station Program Natural Environment Definition for Design
SSP 30426	Rev. D, DCN 001 January 21, 1994	Space Station External Contamination Control Requirements
SSP 30482 Volume 1	Rev. C July 7, 1997	Electrical Power Specifications and Standards Volume 1: EPS Electrical Performance Specifications

SSP 30512	Rev. C June 3, 1994 w/ errata August 15, 2018	Space Station Ionizing Radiation Design Environment
SSP 30558	Rev. C, August 24, 2001 w/ errata August 15, 2018	Fracture Control Requirements for Space Station
SSP 30559	Rev. D February 19, 2008 w/ errata August 15, 2018	Structural Design and Verification Requirements
SSP 30599	Rev. F February 2015	Safety Review Process
SSP 41167	Rev. J March 1, 2016	Mobile Servicing System Segment Specification for the International Space Station Program
SSP 50005	Rev. H April 2, 2020	International Space Station Flight Crew Integration Standard (NASA-STD-3000/T)
SSP 50036	Rev. C. April 15, 2003	Microgravity Control Plan
SSP 50290	Rev. E May 10, 2007	Prime Item Development Specification for Node 2
SSP 50714	Rev G October 7, 2020	International Space Station Program Data Integration Standards
SSP 50808	Rev. G March 2018	International Space Station (ISS) to Commercial Orbital Transportation Services (COTS) Interface Requirements Document (IRD)
SSP 50892	Rev B March 8, 2019	Ethernet Requirements for Interoperability with the Joint Station LAN (JSL)
SSP 50934 Part 1	Rev. A January 2014 and the following PIRNs: PIRN 50934-NA-0002 PIRN 50934-NA-0003	Common Communications for Visiting Vehicles (C2V2) Radio Frequency (RF) Interface Control Document (ICD), Part 1

	PIRN 50934-NA-0005A	
SSP 50949	Rev A April 2015	International Space Station Configuration Document
SSP 50974	July 2016	International Space Station Onboard IT Security Requirements for USOS Systems
SSP 51721	Rev. Baseline September 2019	ISS Safety Requirements Document
SSP 52051, Volume 1	Rev. B September 16, 2013	User Electric Power Specifications and Standards Volume 1: 120 Volt DC Loads
SSQ 21635	Rev. R w/ errata August 21, 2018	General Specification for Connectors and Accessories, Electrical, Circular, Miniature, Intravehicular (IVA)/Extravehicular (EVA)/Robot Compatible, Space Quality
SSQ 21652	Rev. J March 20, 2019	Wire, Electric, Silicon-Insulated, Nickel-Coated Copper, Space Quality, General Specification for
SSQ 21655	Rev. J February 6, 2018	Cable, Electrical, MIL-STD-1553B Notice 2 Data Bus, Space Quality, General Specification for
SSQ 21676	Rev. C w/ DCN 001 March 4, 2004	Coupler, Data Bus, MIL-STD-1553B Notice 2, Space Quality, General Specification
SSQ 22680	Rev. M February 1, 2018	Connectors, Rectangular, (ORU), Space Quality, General Specification For

1. DRD Title: Mass Properties Report		
2. DRD No.: USDV-34	3. Data Type: 2	4. OPR: OM
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
<p>10. Description/Use: The Station control stability and dynamic contact and coupled loads depend on the mass properties of its elements. Structural models are used in conjunction with mass properties to perform Space Station Remote Manipulator System, dynamics, loads, etc., analysis.</p> <p>NASA requires the length, width/diameter, and height, dimensions of the USDV along with any abnormal protrusions. Mass properties of the vehicle are stated by Mass Properties Reports and are reported in the Space Station Analysis Coordinate System – for reference see the SSP 30219, <i>Space Station Reference Coordinate Systems Document</i>.</p>		
<p>11. Distribution:</p> <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's COR BG/CO OA/COR and Alternate COR OM/ISS Systems Engineering and Integration Office ON/USDV Lead</p> <p>Initial Submission: Initial at PDR</p> <p>Additional Submissions:</p> <p>CDR (final as designed) Any major change after CDR CDR + 3 months (final as designed, updated post CDR) CDR + 6 months (final as designed, updated) CDR + 9 months (final as designed, updated) SAR Build complete, dry (final vehicle/element as measured/weighed) L-6 Weeks Build complete, wetted (final vehicle/element as measured/weighed)</p>		

Submission Frequency: Update as required to reflect changes that affect USDV mass properties

Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment.

Interrelationship: SOW: 3.9 *Preliminary Design Review (PDR)*, 3.10 *Critical Design Review (CDR)*, 4.4.5 *System Acceptance Review (SAR)*; DRD: USDV-3

Applicable Documents: SSP 30219, *Space Station Reference Coordinate Systems Document*

Scope: NASA requires the length, width/diameter, and height dimensions of USDV and any abnormal protrusions. Mass properties of the USDV are stated by the Mass Properties Report. NASA commits to the USDV on-orbit mass properties configurations for Docking and subsequent operations.

Contents:

Vehicle		center of gravity			moments of inertia			products of inertia		
Part/Subsystem/Element	mass [pound]	x_cg [inch]	y_cg [inch]	z_cg [inch]	Ixx [pound-inch ²]	Iyy [pound-inch ²]	Izz [pound-inch ²]	Ixy [pound-inch ²]	Ixz [pound-inch ²]	Iyz [pound-inch ²]
Entry 1	xxxxxx. xx									
Entry 2	xxxxxx. xx									
Entry 3...	xxxxxx. xx									
Entry X...	xxxxxx. xx									
Total Vehicle	0.00									

The Products of Inertia shall use either the positive or negative integral convention.

Remarks: N/A

Maintenance: N/A

1. DRD Title: Engineering Computer-Aided Design (CAD) Models		
2. DRD No.: USDV-35	3. Data Type: 2	4. OPR: OM
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
<p>10. Description/Use: The three-dimensional CAD models will be accurate geometrical depictions of the exterior of the vehicle. The CAD models will be used to support mission design, procedure development, clearance analysis, Extra-vehicular worksite analysis, solar array shadowing, and Aerodynamics/Mass Properties Data Book development. The CAD models will also be used to validate hardware interfaces, to ensure hardware will mate on-orbit with International Space Station.</p>		
<p>11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OM/ISS Systems Engineering and Integration Office ON/USDV Lead</p> <p>Initial Submission: Initial at SDR</p> <p>Additional Submissions: PDR CDR (final as designed) CDR + 3 months (final as designed, updated post CDR) CDR + 6 months (final as designed, updated) SAR Build complete (final vehicle/element as measured/weighed)</p> <p>Submission Frequency: Update as required to reflect changes that affect USDV CAD models</p> <p>Format:</p> <ol style="list-style-type: none"> Models shall be full scale in English (inches) units. Models shall be constructed to nominal dimensions. Models should be built with respect to element local coordinate system. 		

- d. Use a format that is compatible with ISS Program.
- e. Models shall be supplied in one of the following formats: NX/Unigraphics (preferred), Standard for the STEP, Computer-Aided Three-Dimensional Interactive Application or PTC Pro-Engineer/Creo Parametric (Creo).
- f. Solid Models Only—Models may be unparameterized “dumb solids” meaning tolerance data; model history, material properties, etc. need not be included.
- g. Model parts should be individual entities and not fused together. This will allow CAD team to update the model based on hardware measurements. Assembly structure, part names and part numbers would be helpful. However, for controlling file size growth and having redundant geometry, all identical components (i.e., handrails, connectors, etc.) will be nested in detail/ditto space/assemblies. For example, if 20 identical handrails are used, only one detail is required, and the rest should be in ditto space/assembly.
- h. Description on movement limits for any articulating items should be provided.
- i. A model tree shall be provided which documents the element model assembly architecture as well as model and subassembly titles.
- j. Models shall be under configuration management so that the pedigree and source of models are documented and retained.
- k. Models and associated assembly trees and configuration data shall be delivered electronically.

Interrelationship: SOW: 2.14 *ISS Integration*, 3.8 *System Definition Review (SDR)*, 3.9 *Preliminary Design Review (PDR)*, 3.10 *Critical Design Review (CDR)*, 4.4.5 *System Acceptance Review (SAR)*; DRD: USDV-3

Applicable Documents: N/A

Scope: N/A

Contents: The 3-D Computer-Aided Design (CAD) models shall be of sufficient detail to provide an accurate depiction of the vehicle. CAD models are required of the end items up to the major assembly.

Exterior CAD models:

CAD models of the exterior of the vehicle shall require the following (but not limited to): docking aids, antennae, cables, cable clamps, debris shields, sensors, thrusters, handrails, vents, cameras, lights, targets). All objects that deploy, rotate, or otherwise move shall be appropriately modeled with location and limit parameters described.

Remarks: N/A

Maintenance: N/A

1. DRD Title: USDV Acceptance Data		
2. DRD No.: USDV-36	3. Data Type: 2	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input checked="" type="checkbox"/> S&MA
10. Description/Use: Acceptance Data provides the objective evidence needed by NASA to establish the acceptability of integrated systems/hardware/software for their intended use.		
11. Distribution: <u>DD-250 and Certificate of Conformance:</u> 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR ON/USDV Lead OE/ISS S&MA/Program Risk Office <u>Acceptance Data:</u> 1 electronic copy: Contractor Repository (as described below) Initial Submission: USDV: Final due at 45 calendar days prior to SAR; USDV Training Simulator: Final due at 6 months prior to SAR If CLIN2A Option is awarded: USDV Critical Spares: Final due at 45 calendar days prior to SAR. Additional Submissions: USDV: Update at Shipment to Acceptance Site and DRR Submission Frequency: Updates required for currency after Government acceptance to reflect changes that affect USDV Acceptance Data Format: An electronic version in the Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment, with specific text searchable contents noted below. Interrelationship: SOW: 2.1 <i>Program Management</i> , 2.6 <i>NASA Insight and Approval</i> , 2.3 <i>Configuration Management</i> , 2.4 <i>Information Technology</i> , 2.11.1 <i>Quality Assurance</i> , 4.4 <i>Milestone C2-4 System Acceptance</i> , 4.4.5 <i>System Acceptance Review (SAR)</i> , 5.1 <i>Dwell Release Review (DRR)</i> ; DRD: USDV-1, USDV-3, USDV-5, USDV-13, USDV-14, USDV-20, USDV-24, USDV-26, USDV-44, E.1 52.246-15 <i>Certificate of Conformance</i> , E.1 52.246-		

2 Inspection of Supplies – Fixed Price, E.2 FAR 52.246-11 Higher-Level Contract Quality Requirement, E.5 Preliminary Inspection at Source and Final Inspection and Acceptance at Destination, H.9 NASA Insight and Approval, Attachment J-40 Deliverable Items List

Applicable Documents: SSP 30695, *Acceptance Data Package Requirements Specification*, NFS Subpart 1846.6, *Material Inspection and Receiving Reports*

Scope: An Acceptance Data Package (ADP) contains the information necessary for NASA, or its delegate, to determine the acceptability of delivered hardware, software, and integrated systems for their intended use. The term “delivery” applies to the delivery of an item at the time of acceptance, as well as any subsequent delivery resulting from modifications, maintenance, refurbishment, or any other activity that produces new data for the delivered item.

Contents:

This DRD establishes the requirements for the minimum acceptance data, which is required for hardware, software, and integrated systems delivered to NASA for USDV.

The Contractor shall deliver a DD250, *Material Inspection and Receiving Report* with a Certificate of Conformance that all required elements of SSP 30695, *Acceptance Data Package Requirements Specification* listed below have been completed successfully and retained electronically. The Certificate of Conformance shall also list the specific delivery location within the Contractor’s repository of the Acceptance Data elements listed below. These Acceptance Data elements shall be in an electronic format and catalogued for NASA to quickly retrieve on demand (remotely or on-site) with hyperlinks to the supporting data. These Acceptance Data elements shall be delivered to a controlled and catalogued Contractor repository for NASA review and download at its discretion from the initial delivery through three (3) years post USDV mission completion, per SOW 2.6 *NASA Insight and Approval*.

The elements listed below shall apply to flight, flight equivalent hardware, GSE, and software and shall follow the definitions of SSP 30695, *Acceptance Data Package Requirements Specification*, unless otherwise defined below. At a minimum, the Acceptance Data elements shall include the following:

Hardware (Flight, Flight equivalent and ground support equipment (GSE))

- Item Description
- Historical Log/Notes/Comments
- Waiver/Deviation Records
- Nonconformances and Unexplained Anomalies (UAs) - A summary listing record (including hyperlinks) of all identified problems, including nonconformances, UAs, unsatisfactory conditions, material review records, and suspect conditions, noted during fabrication, assembly, integration, and/or testing and use of the deliverable hardware item. UAs are defined as anomalies, which cannot be repeated for which a cause cannot

be determined.

- Hardware Shortages
- Unplanned/Deferred Work
- Preplanned/Assigned Work
- Identification of as-designed and as-built listing
- Operating Time/Cycle
- Age-Sensitive/Time-Action Items
- Nonstandard Calibration
- Repair Limitations
- Pressure Vessel Data
- Pyrotechnic Data, including Lot Certificate
- Non-Flight Hardware/Temporary Installations
- Acceptance Verification Matrix and Evidence of Acceptance Completion - The purpose of an Acceptance Verification Matrix (AVM) is to document traceability from hardware acceptance requirements to verification records and results. For acceptance tests within the AVM, include the following: 1) Description of the test item [including hardware name, part number, & serial number(s)]; 2) Description of the test performed; 3) Description of the test equipment and facility; 4) Identification of test witnesses; 5) Test set-up/configuration information; 6) As-Run Test Procedures; 7) Tests results; and 8) Test conclusions.
- Material Safety Data Sheet/Safety Data Sheet (MSDS/SDS) Data
- Battery Data - Include the cell/battery name, part number, serial number (if applicable), lot number (if applicable), cell/battery voltage, capacity, shelf/calendar life, and service/cycle life. Identify storage requirements for cells and/or batteries, which include temperature and state-of-charge. Evidence of successful completion of lot sample testing for each new build or procurement of batteries shall be provided
- Engineering Drawing Tree - A detailed drawing tree, or data list, to identify all drawings, which define the configuration of the deliverable hardware item.

Software (flight, simulations and GSE)

- Notes/Comments
- Waiver/Deviation Records
- Nonconformances and UAs - A summary listing record of all identified problems, including nonconformances, UAs, unsatisfactory conditions, and suspect conditions, noted during software development, integration, and/or testing and use of the deliverable software. UAs are defined as anomalies, which cannot be repeated for which a cause cannot be determined.

- Unplanned/Deferred Work
- Preplanned/Assigned Work
- Specification Document
- Program Listing
- Version Description Document
- User's Guide or System Operating Manual
- Software AVM and Evidence of Software Acceptance Completion - The purpose of an AVM is to document traceability from software acceptance requirements to verification records and results. For acceptance tests, identify acceptance requirements for Acceptance Test Reports. These acceptance requirements for Acceptance Test Reports should address the following: 1) Description of the test item [including hardware name, part number, & serial number(s), software name, software version]; 2) Description of the test performed; 3) Description of the test equipment and facility; 4) Identification of test witnesses; 5) Test set-up/configuration information; 6) As-Run Test Procedures; 7) Tests results; and 8) Test conclusions.

All contents shall be text-searchable. In cases where text-searchable is not possible/feasible, the delivery format shall be negotiated with NASA.

Remarks: To support hardware or software deliveries of USDV, specific data, which identifies and represents the status of the item being delivered, must be provided to NASA. The accumulation of this data, originally delivered for acceptance and subsequently maintained throughout the life of the item, is known as the Acceptance Data.

The Acceptance Data provides a complete and verified status, including the as-built configuration, of hardware or software, contains information pertinent to acceptance, identifies information unique to the item(s), and enables the continuation of required activities by the using organization.

Maintenance: The Acceptance Data is prepared as part of the hardware or software acceptance/delivery criteria and will be maintained throughout the hardware or software life cycle after government acceptance. The Acceptance Data must be maintained throughout integrated testing, ground processing, launch site processing, on-orbit or in-flight operation, post re-entry, and maintenance/modification/refurbishment activities.

1. DRD Title: Command and Telemetry Dictionary		
2. DRD No.: USDV-37	3. Data Type: 1	4. OPR: CA
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The command and telemetry dictionary allow the operations team to understand the data they receive and the commanding capabilities, which exist.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR CA/FOD ON/USDV Lead Initial Submission: Initial at PDR Additional Submissions: Update at CDR; Final at Systems SAR; Updates as required Submission Frequency: Update as required to reflect changes that affect any of the data within the Command and Telemetry Dictionary Format: Format shall be coordinated with NASA for MCC-H compatibility standards (such as XTCE or SSP 50714, <i>Data Integration Standards</i>). Interrelationship: SOW: 3.3 <i>Flight Operations Preparation</i> , 3.9 <i>Preliminary Design Review (PDR)</i> , 3.10 <i>Critical Design Review (CDR)</i> , 4.1 <i>General Requirements</i> , 4.4.2 <i>Flight Operations Preparation</i> , 4.4.5 <i>System Acceptance Review (SAR)</i> , 6.1 <i>General Requirements</i> ; DRD: USDV-3 Applicable Documents: SSP 50714, <i>Data Integration Standards</i> Scope: Applies to all flight, ground, simulation, and test software and hardware on the USDV. Contents: The Command and Telemetry Dictionary shall include a complete list of all commands, which can be sent to the vehicle along with any requirements for success (particular inhibit removed, a particular operating state, etc.). The Contractor shall also include a complete list		

of all parameters received from the spacecraft with a clear explanation of where that data originates and what it represents. The Command and Telemetry Dictionary shall be a sortable database that includes:

- a. Rate group data
- b. Raw and calibrated calibration sensor data
- c. Telemetry format/layout and data
- d. Command definition (e.g., on-board, ground, test specific)
- e. Effector command information
- f. Operational limits (e.g., maximum/minimum values, Launch Commit Criteria (LCC) information, etc.)
- g. Sensor reference information (e.g., measurement type, signal type, subsystem, installation drawing number, part number)
- h. Units of measurement
- i. Any computations performed of the raw data to provide the specific telemetry output

Remarks: N/A

Maintenance: N/A

1. DRD Title: Operations Data Book (ODB)		
2. DRD No.: USDV-38	3. Data Type: 2	4. OPR: CA
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The Operations Data Book (ODB) is the single authoritative source of properly validated data, which most accurately and completely describes the USDV operational performance capabilities and limitations.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's BG/ OA/COR and Alternate COR CA/FOD ON/USDV Lead Initial Submission: Initial at PDR Additional Submissions: Update at CDR; Final at SAR; Updates as required for currency. Submission Frequency: Update as required to reflect changes that affect any of the data within the ODP Format: The Contractor's format in Microsoft Word and shall be in accordance with Data Format section at the beginning of this attachment Interrelationship: SOW: 3.3 <i>Flight Operations Preparation</i> , 3.9 <i>Preliminary Design Review (PDR)</i> , 3.10 <i>Critical Design Review (CDR)</i> , 4.1 <i>General Requirements</i> , 4.4.2 <i>Flight Operations Preparation</i> , 4.4.5 <i>System Acceptance Review (SAR)</i> , 6.1 <i>General Requirements</i> ; DRD: USDV-3 Applicable Documents: N/A Scope: This document is used by the Program, engineering, ground operations, flight operations, and training teams as a vehicle operating guide for ground operations, inflight operations, planning, flight attitude planning, trajectory design, center of gravity management, consumables management, thermal management, systems analysis, procedures development, flight rules development, flight techniques, and training curriculum		

development. This is to include all phases of vehicle operation.

Contents:

The Operations Data Book (ODB) shall provide design and performance information pertaining to spacecraft flight capability envelopes for all subsystems as well as integrated spacecraft performance. This document shall provide flight vehicle operating limitations and constraints, system and vehicle performance data, vehicle capability envelopes, off-nominal analytical information, hardware/software integrated functionality, and integrated schematics.

The ODB shall be used as the standard operational reference for all mission design and planning, simulations, studies, and analyses. The content to be included shall be coordinated with the NASA subsystem managers and NASA to ensure the ODB contains the appropriate level of detailed information to meet the users' needs.

The USDV ODB shall be a written guide and associated images. The sections of User Guide shall include at a minimum:

- a. **Administrative section** containing the following:
 1. Guidance on proprietary/rights in data/export control.
 2. A preface, containing details of related documents and information on how to navigate the system guide.
 3. A content section.
 4. A purpose section, this should be an overview rather than detail the objective of the document.
 5. A scope section is crucial as it also serves as a disclaimer, stating what is out-of-scope as well as what is covered.
 6. A change log.
- b. An **“Operator’s Manual”** section covering the following topics at a level appropriate for crew, flight controllers, and instructors and serves as supplemental data for mission planning, training and operations products, and real-time support:
 1. System overview section:
 - i. Integrated system and subsystem overview descriptions, functionality, schematics, and capabilities. Brief overview of what components are included in the flight system
 - ii. Description of the key architectural guidelines for the flight system and subsystems including physical, functional, information, software, and labeling of components
 - iii. Describe and diagram USDV systems state and sub-states. Include relevant or affected subsystem states and how they relate to the system state
 - iv. Explanation of major components and their operation including schematics

- v. A guide on how to use the main functions of the system
 - vi. Known possible anomalous conditions
 - vii. System and subsystem schematics
 - viii. Diagram of key dimensions of the USDV subsystems
 - ix. Explanation of any built-in tests and on-demand built-in tests
 - x. List of electronic, and electromechanical (EEE) parts and possible electromagnetic interference (EMI) sources
2. Communications Section:
 - i. Description of command and telemetry components
 - ii. Description of full communication stack, from physical layer to application layer, and instructions on how to communicate with the system
 3. System limitations section:
 - i. Quick reference section of system and subsystem limitations (max and min pressures, max and min temperatures, etc.) with reference to consequences of exceeding the operations limits and qualification limits.
 - ii. Systems contingency analysis data, including failure signatures and off-nominal systems and subsystem operations
 - iii. Diagrams or photos that indicate where these limitations can easily be read
 - iv. Description of the key architectural constraints for the flight system and subsystems including physical, functional, information, software
 - v. Include limitations seen and monitored by the user and by ground teams (through telemetry)
 4. System interface section:
 - i. Description of how the system interfaces with ISS, launch vehicle, and NASA Mission Systems.
 5. Nominal operations section:
 - i. Nominal Concept of Operations (ConOps) overview
 - ii. Emergency/off-nominal operations section:
 - iii. Emergency/off-nominal actions for users encountering known failures, failure indications, or impending failure conditions
 - iv. A troubleshooting section detailing possible errors or problems that may occur, along with suggested actions
 - v. Describe overview of fault protection implementation including system

- responses, monitors, thresholds, and intended mitigations
 - vi. Describe and diagram redundancy and any cross-strapping
 - vii. Describe fault protection design philosophy between hardware and software functions and implementations
 - viii. Description of USDV system automatic response to off-nominal conditions and how crew and ground will recognize when automatic actions have been taken
6. Further reference section:
- i. Contact information for subject matter experts
 - ii. References to further documentation
 - iii. Master Equipment List (MEL)
 - iv. Powered Equipment List (PEL)
 - v. Thermal Equipment List (TEL)
- c. A **Systems Data Book** section covering the following topics at a detailed level:
1. Overview of the latest USDV system design configuration:
 - i. Description of requirements driving flight system and subsystem designs for both hardware and software
 2. Overview of the system modes, states, and fault protection for hardware and software
 - i. Identify primary USDV subsystems behaviors (complete description can be included in the flight software area)
 - ii. Depict state transition diagrams and allowable and unallowable state transitions
 - iii. Identify and explain all critical avionics components
 - iv. Identify all critical functionality and any built-in redundancy for critical components
 - v. Fault Detection, Isolation, and Recovery
 3. Summary of key trades studies and analyses

Remarks: N/A

Maintenance: N/A

1. DRD Title: Models and Simulation Plan		
2. DRD No.: USDV-39	3. Data Type 2	4. OPR: CA/EA/OD
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
<p>10. Description/Use: The Modeling and Simulation Plan will specify the approach for developing engineering models and simulations and USDV training simulators, including compliance with NASA-STD-7009, <i>Standard for Models and Simulations</i>, specification of interfaces for exchanging data between distributed simulations, specification of mechanisms for direct binary and source code model exchanges, and the definition of the models to be exchanged with the ISS Program.</p>		
<p>11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OD/ISS Avionics & Software Office ON/USDV Lead CA/FOD</p> <p>Initial Submission: Initial at SDR</p> <p>Additional Submissions: Update at PDR, Final at CDR</p> <p>Submission Frequency: Update as required to reflect changes that affect Models and Simulation Plan implementation</p> <p>Format: The Contractor's format acceptable for the Plan. Specific formats for model and simulation deliveries will be negotiated.</p> <p>Interrelationship: SOW: 2.9.6 <i>Test Facility Capability</i>, 2.15 <i>Flight Operations</i>, 3.3 <i>Flight Operations Preparation</i>, 3.8 <i>System Definition Review (SDR)</i>, 3.9 <i>Preliminary Design Review (PDR)</i>, 3.10 <i>Critical Design Review (CDR)</i>, 4.1 <i>General Requirements</i>, 4.3.2 <i>Flight Operations Preparation</i>, 4.4.2 <i>Flight Operations Preparation</i>, 6.1 <i>General Requirements</i>; DRD: USDV-3, USDV-46, USDV-47</p> <p>Applicable Documents: NASA-STD-7009, <i>Standard for Models and Simulations</i>, NPR 7150.2, JSC-35194, and JSC-35194, <i>MTC Training Center Generic Simulation Interface Specification</i></p>		

Scope: The Contractor shall develop and deliver a Modeling and Simulation plan. The plan shall detail the approach to satisfy the requirements of NASA-STD-7009, *Standard for Models and Simulations*. The plan shall identify the model and simulations to be used for product development and training simulations, and those to be shared with the ISS Program for analytical or verification purposes.

Contents:

Part A:

The Contractor shall develop a document that:

- a. Identifies the models the contractor develops for USDV functionality
- b. Demonstrates compliance with modeling and simulation development best practices per NASA-STD-7009, *Standard for Models and Simulations*
- c. Documents the approach and mechanisms for collaborating with the ISS Program on USDV model requirements and exchanges.

These models shall have sufficient fidelity for vehicle-wide control, integrated checkout, interfaces, training, and testing.

The models shall also provide sufficient fidelity, response time, and user configurability to support operational simulations between the ISS flight control team, the USDV flight control team and flight instructor team.

Part B:

The Contractor shall provide a specification for each model that contains the following information:

- a. Coverage of NASA-STD-7009, *Standard for Models and Simulations* requirements.
- b. Identification of models and simulations to be exchanged with the ISS Program for integrated analysis, testing, and integrated training simulations.
- c. Model registration such as name, version, release date, and intended use.
- d. Programmatic planning information such as the development schedule, exchange agreements, and dependent organizations.
- e. Identification of operating systems, programming languages, and package dependencies.
- f. NASA-STD-7009, *Standard for Models and Simulations* related information including criticality assessment results, assumptions, permissible use, V&V status, uncertainty characterization, and documentation and review status.
- g. NPR 7150.2, *NASA Software Engineering Requirements* related information including software classification and safety criticality rating.
- h. For USDV training model and simulation, mechanisms to comply with JSC-35194, *MTC Training Center Generic Simulation Interface Specification*, on distributed simulation and model exchange methodologies. The USDV training model shall provide sufficient fidelity, response time, and NASA user configurability to support

operational simulations with nominal and off-nominal complex situations between the NASA flight control team, NASA training instructor, and the USDV sustaining engineering team.

Remarks: N/A

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: USDV Launch Site Integration Plan (LSIP)		
2. DRD No.: USDV-40	3. Data Type: 1	4. OPR: ON/Launch Services Program (LSP)
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
<p>10. Description/Use: The USDV LSIP details all planned activities required to perform USDV launch site processing from transportation to the Space Station Processing Facility (SSPF) and LS PPF through integration with the LV and final pre-launch/countdown preparations. The LSIP identifies USDV support requirements and provides the basis for the development of all USDV requirements used by the KSC LSP in preparation of the Launch Site Support Plan (LSSP), which is used to procure the PPF. The LSIP also provides input for the initial development of the Launch Services IRD, used in the procurement of the LV by KSC LSP; as well as the initial development of the USDV/LV ICD. The LSIP also identifies the plan for USDV ground processing (non-hazardous and hazardous), encapsulation, and USDV readiness.</p>		
<p>11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR KSC/Launch Service Program SP</p> <p>Initial Submission: Initial at CDR</p> <p>Additional Submissions: Final at SIR</p> <p>Submission Frequency: Update as required to reflect changes that affect LSIP implementation.</p> <p>Format: Contractor's format acceptable and shall be in accordance with Data Format section at the beginning of this attachment</p> <p>Interrelationship: SOW: 3.10 <i>Critical Design Review (CDR)</i>, 4.2.1 <i>Launch Vehicle Integration</i>, 4.2.4 <i>System Integration Review (SIR)</i>, 4.3.1 <i>Launch Vehicle Integration</i>, 4.4.1 <i>Launch Vehicle Integration</i>; DRD: USDV-3</p> <p>Applicable Documents: N/A</p> <p>Scope: The LSIP shall define and document the plan and support activities that are necessary</p>		

for pre-launch I&T activities and the technical aspects of launch operations at the launch site. The LSIP shall define the plan for USDV ground processing (non-hazardous and hazardous), encapsulation, and USDV readiness.

Contents:

The Launch Site Integration Plan (LSIP) shall define and document the support activities that are necessary for pre-launch I&T activities and the technical aspects of launch operations.

The LSIP shall specify all launch base facilities utilized for USDV integration & testing (I&T), support services, and materials. Instrument facility utilization and support requirements should be identified as applicable.

The LSIP shall document compliance with all Eastern Range safety training, security, and Personal Reliability Program requirements.

The LSIP shall define the plan for USDV ground support equipment (GSE) set-up at the launch site processing facilities, post-ship check-outs and testing, battery charging, high pressure gas loading, fueling, ground processing (non-hazardous and hazardous), encapsulation, and USDV readiness.

The LSIP shall include:

1.0 General

1.1 Plan Organization

1.2 Plan Scope

1.3 Applicable documents [Include: Itemized Procedure List w/ Hazardous/Non-Haz. Designation]

1.4 USDV Hazard System Summary

2.0 Launch Site Management

2.1 Organization

2.2 Payload Processing Facility (PPF)/Control Room/Office Assignments

2.3 Meetings

2.4 Schedule -Master Schedule

3.0 Pre-launch/Launch Test Operations Summary

3.1 Schedule -Daily/Shift Detailed Schedule

3.2 Layout of Equipment (Electrical GSE/Mechanical GSE/Flight Hardware)

3.2.1 Test Flow Depiction - Identify staging transitions for subject hardware as a function of processing schedule events

3.3 Description of Events at Launch Site

3.3.1 USDV Delivery/Receipt Operations

3.3.2 Standalone Payload Processing Facility Operations (Non-Hazardous/Hazardous)

3.3.2.1 USDV Electrical I&T

3.3.2.2 USDV Mechanical I&T

3.3.2.3 USDV Propulsion I&T

3.3.2.4 Instrument I&T

3.3.2.5 Exam Testing Engine Testing

3.3.2.6 Launch Countdown Rehearsals (As Applicable)

3.3.2.7 USDV Inspections and Closeouts

- 3.3.3 Integrated PPF Operations
 - 3.3.3.1 USDV Mate with launch vehicle (LV) Payload Adapter
 - 3.3.3.2 USDV Post-Mate Testing
 - 3.3.3.3 USDV Encapsulation
 - 3.3.3.4 USDV Post-Encapsulation Testing
 - 3.3.3.5 Encapsulated USDV Transportation Operations
- 3.3.4 LV Facility Operations
 - 3.3.4.1 USDV Preparations for Pad Operations
 - 3.3.4.2 Post LV Mate Electrical Testing
 - 3.3.4.3 USDV Mechanical Activities (As applicable)
 - 3.3.4.4 USDV Closeout Activities (As applicable)
 - 3.3.4.5 USDV Launch Countdown Support
- 3.4 USDV LCC
- 3.5 USDV Environmental Requirements
 - 3.5.1 PPF Requirements
 - 3.5.2 LV Facility Requirements
 - 3.5.3 Transport Operations
 - 3.5.4 Payload Fairing – Access/Environmental Control System
 - 3.5.5 Instrument Purge Operations
- 4.0 Contingency Operations
 - 4.1 Hurricane & Wildfire Contingency
 - 4.1.1 Pre-Encapsulation
 - 4.1.2 Post-Encapsulation
 - 4.2 Lightning Strike Contingency
 - 4.3 Propellant Offload Contingency
- 5.0 Personnel Training Requirements and Certifications
- 6.0 Security
- 7.0 Safety
- 8.0 Special Support Requirements
 - 8.1 Communications (Voice/Video/IT)
 - 8.2 Command/Telemetry
 - 8.3 Contractor’s displays and tools required to support and monitor USDV Ground Processing, Pre-Launch and Launch activities
- 9.0 USDV Ground Processing Plan
 - 9.1 USDV and GSE Handling & Transport (e.g., Arrival at PPF, PPF to Pad)
 - 9.2 USDV GSE set-up
 - 9.2 Post-ship check-outs and testing
 - 9.3 Ground Processing Plan (e.g., battery charging, high pressure gas loading, fueling)
 - 9.5 Pre-launch and launch operations and USDV readiness

Remarks: N/A

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since last submittal.

1. DRD Title: Launch Site Integration and Test (I&T) Procedures		
2. DRD No.: USDV-41	3. Data Type: 2	4. OPR: ON/LSP
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The Launch Site I&T Procedures document the step-by-step integration and testing process performed at the launch site to mechanically and electrically integrate the USDV and verify compliance with applicable performance specifications and programmatic requirements.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR ON/USDV Lead KSC/Launch Service Program Initial Submission: Final at SIR Additional Submissions: N/A Submission Frequency: Update as required to reflect changes that affect Launch Site I&T procedures Format: Contractor's format acceptable and shall be in accordance with Data Format section at the beginning of this attachment Interrelationship: SOW: 4.2.1 <i>Launch Vehicle Integration</i> , 4.2.4 <i>System Integration Review (SIR)</i> , 4.3.1 <i>Launch Vehicle Integration</i> , 4.4.1 <i>Launch Vehicle Integration</i> ; DRD: USDV-3 Applicable Documents: N/A Scope: Identifies the Launch Site I&T procedures for all activities executed at the launch site. Contents: a. Launch Site Integration and Test (I&T) Procedures shall include mechanical integration, mechanical operations, electrical testing, transportation & handling, fueling, and standard operational procedures. b. Launch Site Integration and Test Procedures shall also include operations for		

Communications Security (COMSEC) security verifications tests.

- c. Launch Site Integration and Test Procedures shall be developed for operations from the beginning of USDV integration through launch. Launch site procedures shall be delivered to KSC Launch Service Program (LSP) (via the ISS Program) for evaluation ahead of USDV arrival at the launch site PPF.
- d. Launch Site I&T Procedures shall be developed in support of instrument Safe-to-Mate testing.
- e. Launch Site I&T Procedures shall be developed in support of the end-to-end test program, as a means for establishing the test configuration required by the applicable end-to-end test.
- f. The Launch Site I&T Procedures shall contain the following information:
 - 1. Test Objectives/Test Requirements to be verified
 - 2. Test Methods
 - 3. Applicable Documents and Software
 - 4. Required USDV Configuration
 - 5. Mechanical and Test Equipment Configuration
 - 6. Mechanical and Test Equipment Identification
 - 7. Instrumentation
 - 8. Safety Provisions and Cautions
 - 9. Program Quality Requirements
 - 10. Detailed Instructions
 - 11. Data Recording Requirements
 - 12. Data Recording Forms and Tables
 - 13. Accept/Reject Criteria per Documented Requirement
 - 14. Data Trending (Pre-Defined Parameters Trended within Test Run)
 - 15. Procedure Change Record Listing

Remarks: N/A

Maintenance: N/A

1. DRD Title: USDV Launch Commit Criteria (LCC)		
2. DRD No.: USDV-42	3. Data Type: 2	4. OPR: ON/LSP
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The USDV LCC is the governing list for determining when a launch hold must be called and should be strictly enforced.		
<p>11. Distribution:</p> <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OD/ISS Avionics & Software Office ON/USDV Lead CA/FOD KSC/SP</p> <p>Initial Submission: Initial at CDR</p> <p>Additional Submissions: Final at SAR</p> <p>Submission Frequency: Updates as required to reflect changes that affect USDV LCC definition or implementation.</p> <p>Format: Contractor's format acceptable and shall be in accordance with Data Format section at the beginning of this attachment</p> <p>Interrelationship: SOW: 3.10 <i>Critical Design Review (CDR)</i>, 4.4.1 <i>Launch Vehicle Integration</i>, 4.4.5 <i>System Acceptance Review (SAR)</i>, 6.2.3 <i>Launch Operations Preparation</i>; DRD: USDV-3</p> <p>Applicable Documents: LSP-PD-120.05, <i>Launch Telemetry Requirements</i></p> <p>Scope: The USDV LCC shall document the criteria to be used to commit the USDV for launch.</p> <p>Contents: The USDV Launch Commit Criteria (LCC) shall define and document the following:</p>		

- a. Criteria for the ISS, USDV spacecraft, instruments, launch control center(s), mission control center, launch critical ground support equipment (GSE), and associated activities prior to liftoff.
- b. Hold criteria for USDV, included but not limited to the following guidelines:
 - i. Anything that could result in unacceptable risk to the long-term health and safety of the USDV
 - ii. Anything that could result in significant loss of redundancy of major subsystems and/or instruments
 - iii. Anything that could result in either of the above items if current trending continued.
- c. Identify Mandatory USDV LCC per LSP-PD-120.05, *Launch Telemetry Requirements*: a requirement that is necessary to either make mission or verify mission success. Mandatory can only be waived in extreme cases prior to terminal count. Once within terminal count, a mandatory requirement cannot be waived. The definition of terminal count is tailored for each launch vehicle. The definition of terminal count will be defined in the Launch Management Coordination Meeting for each mission.
- d. Identify Required USDV LCC per LSP-PD-120.05, *Launch Telemetry Requirements*: a requirement that is necessary to either make mission or verify mission success; however, can be waived with the proper work-around or rationale.
- e. The approach for monitoring the USDV LCC configuration for launch via real-time telemetry.
- f. Each USDV LCC telemetry parameter shall be tabulated with its acceptable values, tolerances, trending patterns, and out-of-limits conditions, which would require a resolution prior to launch.
- g. The approach for coordinating the USDV LCCs with the ISS Flight Operations Directorate (FOD) Team for mission operations-related criteria.

Remarks: N/A

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Post Dock Assessment		
2. DRD No.: USDV-43	3. Data Type: Plan – 1 Results - 2	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: After docking with the ISS, a post-arrival assessment shall be provided to include the performance of the USDV, including raw data.		
<p>11. Distribution:</p> <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR ON/USDV Lead CA/FOD</p> <p>Initial Submission: Part A: Initial due at CDR, Part B: Final due 60 calendar days after USDV docking to the ISS.</p> <p>Submission Frequency: Part A: Final due at SAR. Update as required for currency to incorporate changes to the plan.</p> <p>Part B: No additional updates.</p> <p>Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment.</p> <p>Interrelationship: SOW: 3.10 <i>Critical Design Review (CDR)</i>, 4.4.5 <i>System Acceptance Review (SAR)</i>, 6.3.2 <i>Flight Operations</i></p> <p>Applicable Documents: N/A</p> <p>Scope: The Post Dock Assessment shall cover the plan and results from the USDV activities from launch through docking and system integration/checkout with the ISS.</p> <p>Contents:</p> <p>The Post Dock Assessment shall cover the plan and results from the USDV activities from launch through docking and system integration/checkout with the ISS.</p>		

Part A: The Plan

- a. Description of all objectives to be completed.
- b. Rationale for each objective
- c. Success criteria for each objective.
- d. Methods, tools, processes, procedures, resources, and timeline required for evaluation for each objective.
- e. Any dependencies on other systems or processes.
- f. Integrated operations timeline with all objectives (i.e., sequence, duration, operator, resources, timing, priority, etc.).

Part B: The Results

- a. Comparison of predicted and actual vehicle and system performance
- b. Explanation of significant differences between the predicted and actual flight environments, configurations, procedures, etc.
- c. Identification of problems, anomalies, and malfunctions over the course of the mission and their impact on the USDV and the overall mission.
- d. Recommended corrective actions and anomaly resolutions.
- e. Completion status of all objectives, detailed data results, assessment of the data, and documentation of success.
- f. Assessment of the adequacy of training of USDV contractor sustaining personnel and NASA Flight Operations personnel. Plan to resolve any identified issues.
- g. Assessment of adequacy of operations and operations tools used to support real-time operations. Plan to resolve any identified issues.

Remarks: Part A- The Plan will be jointly developed with NASA

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Qualification and Acceptance Plan		
2. DRD No.: USDV-44	3. Data Type: 1	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: To provide the qualification plan and approach to demonstrate that the design and performance requirements can be demonstrated for all USDV requirements, including the range of projected environments and operating conditions anticipated over the service life. To provide the acceptance plan and approach to demonstrate that a component, subsystem, or system is capable of meeting performance requirements.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OD/ISS Avionics & Software Office ON/USDV Lead Initial Submission: Initial Part a (Qualification and Acceptance Approach) at Proposal, Initial Part b (Qualification and Acceptance Plan) at MCR Additional Submissions: Update at SRR, Final at PDR; Update at CDR, Update at SIR Submission Frequency: Update as required to reflect changes that affect Qualification and Acceptance Plan implementation Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment. Interrelationship: SOW: 3.6 <i>Mission Concept Review (MCR)</i> , 3.7 <i>System Requirements Review (SRR)</i> , 3.9 <i>Preliminary Design Review (PDR)</i> , 3.10 <i>Critical Design Review (CDR)</i> , 4.2.4 <i>System Integration Review (SIR)</i> ; DRD: USDV-3 Applicable Documents: SSP 51101, <i>US Deorbit Vehicle Systems Requirements Document (SRD)</i> Scope: The Qualification and Acceptance Plan contains the qualification approach and plan for demonstrating that the design and manufacturing processes produce software, systems, and components that conform to all USDV performance requirements including the range of projected environments and operating conditions anticipated over the service life. These qualification tests demonstrate that the design and performance requirements for a system and		

component can be demonstrated under specified conditions, including stress, thermal, EEE parts, stress/de-rating, structural, software internal and external interfaces, off-gassing, flammability, toxicological, and others specific to the product. The Qualification and Acceptance Plan contains the acceptance approach and plan for demonstrating that a component, subsystem, or system is capable of meeting performance requirements.

Contents:

The Qualification and Acceptance Plans shall contain the following:

a. Qualification and Acceptance Approach

1. Qualification Approach:

- i. Approach for identifying qualification tests in accordance with SSP 51101, *US Deorbit Vehicle Systems Requirements Document (SRD)* for components, subsystems, and systems to demonstrate that the design and manufacturing processes produce systems and components that conform to all USDV performance requirements including the range of projected environments and operating conditions anticipated over the service life
- ii. Approach for identification of which items will undergo testing to qualification margins and durations or proto-qualification margins and durations and associated rationale. Reference SSP 51101, *US Deorbit Vehicle Systems Requirements Document (SRD)* for Ground Testing requirements.
- iii. Initial identification of systems, subsystems and components proposed for proto-qual margins and rationale for waiver to SSP 51101, *US Deorbit Vehicle Systems Requirements Document (SRD)*.
- iv. Approach for qualification tests of flight-proven components, subsystems, and systems and preflight components, subsystems, and systems that conform to all USDV performance requirements including the range of projected environments and operating conditions anticipated over the service life
- v. Approach to inclusion of relevant use in a similar flight environment into rationale for the proposed test
- vi. Approach to Software Qualification

2. Acceptance Approach:

- i. Approach for identifying acceptance tests for components, subsystems, and systems to demonstrate they are capable of meeting performance requirements.

b. Qualification and Acceptance Plan

1. Qualification Plan for all components, subsystems, and systems including:

- i. Description and name of the test item
- ii. Environmental requirements

- iii. Test requirements, definition, and items
 - iv. Identification of whether the item will undergo testing to qualification margins and durations or proto-qualification margins and durations, and associated rationale. Reference SSP 51101, *US Deorbit Vehicle Systems Requirements Document (SRD)* for Ground Testing requirements
 - v. Identification of relevant use in a similar flight environment and the associated impact to proposed test
2. Software Qualification Plan additional details:
 - i. Allocation of top-level requirements to Software Requirements Specifications or equivalent
 - ii. Software configuration item functional qualification test plans
 - iii. How software configuration definition, control, and documentation (configuration data/files/pre-positioned load files, software versions, hardware versions, simulations, test scripts and versions, test procedures) will be incorporated into test plans
 3. Acceptance Plan for all components, subsystems, and systems including:
 - i. Description and name of the test item
 - ii. Environmental, safety, and operational requirements
 - iii. Test requirements, definition, and items

Remarks: The Contractor is encouraged to make use of existing standardized plans, procedures, and related products that meet the intent of this DRD. It is permissible to use multiple contractor standard plans and procedures to meet the intent of this DRD (rather than creating a single document).

The final plan, as approved, shall be incorporated in the contract as Attachment J-28, *Qualification and Acceptance Plan*.

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: USDV Guidance Navigation and Control (GNC) Models and Data		
2. DRD No.: USDV-45	3. Data Type: 1	4. OPR: ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: To provide USDV GNC model and data deliveries for implementation into the Station/Orbiter Multibody Berthing Analysis Tool (SOMBAT) used to verify mated GNC performance meets integrated requirements.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OD/ISS Avionics & Software Office OM/ISS Systems Engineering and Integration Office ON/USDV Lead Initial Submission: Part A: PDR, Part B: CDR Additional Submissions: Final (Part A): CDR, Updates at SIR and APR, Final submission 6 months prior to SAR Submission Frequency: Updates as required to reflect changes that affect delivery of data and model inputs to NASA for the GNC models and data. Format: Source code files, configuration data, and inputs and outputs of test cases inputs in ASCII format; technical description document in contractors' format Interrelationship: SOW: 2.14 <i>ISS Integration</i> , 3.9 <i>Preliminary Design Review (PDR)</i> , 3.10 <i>Critical Design Review (CDR)</i> , 4.1 <i>General Requirements</i> , 4.2.4 <i>System Integration Review (SIR)</i> , 4.3.3 <i>Assembly, Integration, and Test Progress Review (APR)</i> , 4.4.5 <i>System Acceptance Review (SAR)</i> , 6.1 <i>General Requirements</i> Applicable Documents: NASA-STD-7009, <i>Standard for Models and Simulations</i> Scope: GNC Models and Data for attitude control and translational maneuvers during mated operations on ISS, including deorbit.		

Contents:**Part A:**

The Contractor shall develop a Guidance Navigation and Control (GNC) Model and Data Delivery Plan that:

- a. Identifies the models, algorithms and modes, and data to address requirements in Part B
- b. For each model, algorithm and mode, and data, identify the format and contents
- c. Demonstrates compliance with modeling and simulation development best practices per NASA-STD-7009, *Standard for Models and Simulations*, and
- d. Documents the approach, mechanisms, and schedule for collaborating with the ISS Program on USDV GNC model and data requirements and exchanges.

Part B:

- a. The USDV GNC Model Delivery shall include the following models and description document:
 1. USDV GNC Flight Software algorithms and modes (actual source code) for mated operations. Algorithm delivery shall include failure response matrix for sensors and actuators specifying the USDV configuration due to these failures.
 2. Navigation sensor models for inertial/Inertial Measurement Unit (IMU) sensors (angular rate gyros, linear accelerometers), absolute orbital Position, Velocity, Time (PVT) sensors (Global Positioning System, etc.), and absolute attitude sensors (star-trackers, etc.)
 3. Control Actuator models – Reaction Wheels or Control Moment Gyros (CMGs), Thrusters (magnitude, locations, directions, Specific Impulse (Isp,) mass flow rate, gimbal model, etc.)
 4. Technical description document for GNC algorithms and models in Part B paragraph a, items 1-3, containing the following items:
 - i. Data dictionary of variables and parameters used in the models
 - ii. Description of algorithms, including input and output parameters
 - iii. Description of control modes
 - iv. List of algorithms called by the different control modes
- b. The USDV Data delivery shall include the following items:
 1. Configuration data for models in Part B, paragraph a, items 1-3. The configuration data shall include uploadable parameters such as controller gains and filter coefficients, as well as settings for pulse-train or similar thruster firing restriction logics.
 2. Results from USDV GNC Simulations test cases showing GNC Input/Output Data for various mated Attitude Control scenarios (attitude holds, attitude

maneuvers, rate/Loss of Attitude Control (LoAC) recoveries, translation burns, etc.) that can be used for NASA to validate the correct implementation of USDV GNC into Station/Orbiter Multibody Berthing Analysis Tool (SOMBAT). The GNC Input/Output Data shall include:

- i. Attitude and Angular Rates from Navigation system
- ii. Attitude and Attitude Rate Errors inputs to the Controller
- iii. Controller Commands and Controller Torques
- iv. Outputs from Actuators
 - a) Angular Momentum, if applicable
 - b) Thruster Firing Data (Jet Firing History)
- v. Propellant Usage
- vi. Additional parameters to match the test cases, as needed

Remarks: N/A

Maintenance: N/A

1. DRD Title: Specification for USDV Avionics and Software/Hardware-In-The-Loop (HITL) Test Bed		
2. DRD No.: USDV-46	3. Data Type: 2	4. OPR: OD/ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The Specification for USDV HITL Test Bed documents the type and pedigree of the avionics and software components to be utilized for the USDV integrated avionics and software testing, verification, validation, and flight following.		
<p>11. Distribution:</p> <p>1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OD/ISS Avionics & Software Office OM/ISS Systems Engineering and Integration Office ON/USDV Lead</p> <p>Initial Submission: Initial at SDR</p> <p>Additional Submissions: Final at CDR</p> <p>Submission Frequency: Update as required to reflect proposed changes to the USDV HITL Test Bed Specification.</p> <p>Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment</p> <p>Interrelationship: SOW: 2.9.6 <i>Test Facility Capability</i>, 3.4 <i>Avionics & Software Simulation and Test Preparation</i>, 3.8 <i>System Definition Review (SDR)</i>, 3.10 <i>Critical Design Review (CDR)</i>, 4.2.3 <i>Avionics & Software Simulation and Test Finalization</i>, 5.0 <i>Dwell (CLIN 3)</i>, 6.1 <i>General Requirements</i>; DRD: USDV-3, USDV-39</p> <p>Applicable Documents: SSP 51101, <i>US Deorbit Vehicle Systems Requirements Document (SRD)</i></p> <p>Scope: The Specification for USDV HITL Test Bed shall cover the HITL test bed used for the USDV end-to-end verification and certification campaign.</p> <p>Contents:</p>		

The Specification for USDV Hardware-In-The-Loop (HITL) Test Bed shall identify the flight-like hardware components and flight software comprising the HITL Test Bed. The HITL Test bed shall have all the hardware and software components necessary to perform a high-fidelity, integrated end-to-end verification of all applicable flight critical USDV mission objectives and applicable requirements in SSP 51101, *US Deorbit Vehicle Systems Requirements Document (SRD)*. This HITL Specification document shall contain the following:

- a. The USDV HITL architecture and design requirements
- b. An inventory list of the Hardware, including fidelity specification, part numbers, serial numbers, and quantity.
- c. An inventory list of the software products, including all support systems or software required.
- d. An inventory list of the models and simulations used in the HITL test bed.
- e. Data verifying that flight-like avionics hardware will load and execute the actual flight software with the same functionality, timing, and performance as the actual flight avionics hardware.
- f. Known differences between the full list of actual flight avionics components and the flight-like components used in the HITL Test Bed.
- g. Model anchoring, alternate test facilities and their scope, historical performance issues, supplier quality limitations, exceptions to test-as-you-fly.
- h. Version and Configuration information

Remarks: N/A

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Specification for USDV Software Development Integration Laboratory (SDIL) Simulator for ISS Integration Testing		
2. DRD No.: USDV-47	3. Data Type: 2	4. OPR: OD/ON
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The Specification for USDV SDIL Simulator for ISS integration testing documents the type and pedigree of the avionics and software components to be utilized for the USDV/ISS integration testing, verification, validation, and flight following.		
11. Distribution: 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/CO OA/COR and Alternate COR OD/ISS Avionics & Software Office OM/ISS Systems Engineering and Integration Office ON/USDV Lead Initial Submission: Initial at SDR Additional Submissions: Final at CDR Submission Frequency: Update as required to reflect proposed changes to the USDV SDIL Simulator for ISS Integration Testing Specification Format: The Contractor's format is acceptable and shall be in accordance with Data Format section at the beginning of this attachment Interrelationship: SOW: 2.9.6 <i>Test Facility Capability</i> , 3.4 <i>Avionics & Software Simulation and Test Preparation</i> , 3.8 <i>System Definition Review (SDR)</i> , 3.10 <i>Critical Design Review (CDR)</i> , 4.2.3 <i>Avionics & Software Simulation and Test Finalization</i> , 5.0 <i>Dwell (CLIN 3)</i> , 6.1 <i>General Requirements</i> ; DRD: USDV-3, USDV-39 Applicable Documents: SSP 51101, <i>US Deorbit Vehicle Systems Requirements Document (SRD)</i> Scope: The Specification for USDV SDIL Simulator for ISS integration testing shall cover the USDV SDIL Simulator used for the USDV/ISS integration test campaign		

Contents:

The Specification for USDV Software Development Integration Laboratory (SDIL) Simulator for ISS Integration testing identify the flight-like hardware components, flight software, interfaces, connectivity, and configuration comprising the USDV SDIL Simulator for ISS integration testing and verification of all applicable flight-critical ISS-integrated USDV mission objectives and applicable requirements in SSP 51101, *US Deorbit Vehicle Systems Requirements Document (SRD)*, including:

- a. The USDV SDIL Simulator for ISS integration testing architecture and design requirements, including data interfaces to ISS.
- b. The USDV SDIL Simulator details required for NASA to complete the SDIL Interface Control Document (ICD): Lab power interface, Weight, Footprint size, Flight interfaces, non-flight interfaces, other data necessary to accommodate the USDV SDIL simulator in SDIL.
- c. An inventory list of the Hardware, including fidelity specification, part numbers and serial numbers, quantity.
- d. An inventory list of the software products, including any support systems or software required.
- e. An inventory list of the models and simulations used in the USDV SDIL simulator.
- f. Data verifying that flight-like avionics hardware will load and execute the actual flight software with the same functionality, timing, and performance as the actual flight avionics hardware.
- g. Known differences between the full list of actual flight avionics components and the flight-like components used in the USDV SDIL simulator.
- h. Model anchoring, alternate test facilities and their scope, historical performance issues, supplier quality limitations, exceptions to test-as-you-fly.
- i. Versions and configuration information

Remarks: N/A

Maintenance: DRD deliverable submittals shall include two versions: 1) Clean copy with redlines incorporated and 2) Redlined version showing the updates made since the last submittal.

1. DRD Title: Flight Operations Review (FOR) Data Package		
2. DRD No.: USDV-48	3. Data Type: 2	4. OPR: CA
5. Solicitation No.: 80JSC023R0003		6. Contract No.: 80JSC024CA002
7. Date Issued: June 25, 2024	8. Date Revised: <i>To be filled in by CO at first revision of this DRD after contract award</i>	9. DRD Category: <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> S&MA
10. Description/Use: The FOR Data Package will contain contractor-developed procedures for review at the FOR to address operation of the USDV by Flight Control Personnel and ISS crew for nominal, off-nominal, and contingency scenarios.		
11. Distribution: 1 electronic copy: NASA FOD Repository for FOR 1 electronic copy: ISS Program Authorized Repository Program Authorized Repository Upload Notification: Contractor's CO BG/COR OA/COR and Alternate COR OD/ISS Avionics & Software Office OM/ISS Systems Engineering and Integration Office ON/USDV Lead Initial Submission: Initial at 30 calendar days prior to FOR Additional Submissions: Update at 30 calendar days prior to Delta FOR Submission Frequency: Updates as necessary Format: In accordance with NASA System Operations Data File standards. Interrelationship: SOW: 4.3.2 <i>Flight Operations Preparation</i> , 4.4.4 <i>Flight Operations Review (FOR)</i> ; DRD: N/A Applicable Documents: JSC 36054, <i>Systems Operation Data File Management Plan</i> and associated annexes, SSP 50252 <i>Operations Data File Standards</i> , and SSP 50254, <i>Operational Nomenclature (OpNom)</i> Scope: The FOR Data Package shall include nominal, off-nominal and contingency scenarios. Contents: a. The Contractor shall deliver the USDV operations procedures		

1. All nominal operations to be executed by flight controllers
 2. All off-nominal and contingency operations to be executed by flight controllers, which have been identified by test, analysis, or system experience, or which are determined to be safety critical based on likelihood or resulting consequence.
- b. The Contractor's USDV operations procedures shall meet the following standards
1. Procedures shall adhere to Standards outlined in SSP 50252, *Operations Data File Standards*, and SSP 50254, *Operational Nomenclature (OpNom)*.
 2. Procedures shall include placards, cautions, warnings, or other notes when a hazardous operation or procedure affects or could affect a safety-critical system.
 3. Procedures shall verify constraints prior to performing a task.
 4. Procedures shall include the Operations Controls identified as part of the Safety Review Process.
 5. Flight operations procedures shall clearly designate who is to perform which actions, especially between mission control personnel, as required. The procedure shall identify if the action must be performed at a specific time or if the action is time critical.
 6. The Contractor shall validate the procedures prior to delivery and provide the procedure validation records per JSC 36054 Annex 3, *Systems Operation Data File Management Plan: Procedure Validation Plan*. Validation of procedures may include human-in-the-loop testing, real or simulated flight or ground hardware, operational or programmatic simulations, etc. Validation of procedures involving software should utilize real flight (or ground) software to the greatest extent practical.

Remarks: The primary delivery of the procedures is to the NASA FOR electronic repository. Once the Contractor has completed delivery of the procedures to the NASA FOR electronic repository, the Contractor shall submit an EDMS Delivery Notice with an official transmittal letter notification to document time, date, and location the FOR Data Package were delivered to for the official contract record of completion.

No final version of the DRD. Following the FOR, the procedures are updated through Change Request process as defined in JSC 36054 Annex 2, *Systems Operation Data File Management Plan: Configuration Control Plan*. During mission execution, procedures are updated per Operational Interface Procedures (OIP) 5.2.1.1, *Operational Interface Procedures*.

Maintenance: N/A

1. All nominal operations to be executed by flight controllers
 2. All off-nominal and contingency operations to be executed by flight controllers, which have been identified by test, analysis, or system experience, or which are determined to be safety critical based on likelihood or resulting consequence.
- b. The Contractor's USDV operations procedures shall meet the following standards
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 5. Flight operations procedures shall clearly designate who is to perform which actions, especially between mission control personnel, as required. The procedure shall identify if the action must be performed at a specific time or if the action is time critical.
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Remarks: The primary delivery of the procedures is to the NASA FOR electronic repository. Once the Contractor has completed delivery of the procedures to the NASA FOR electronic repository, the Contractor shall submit an EDMS Delivery Notice with an official transmittal letter notification to document time, date, and location the FOR Data Package were delivered to for the official contract record of completion.

No final version of the DRD. Following the FOR, the procedures are updated through Change Request process as defined in JSC 36054 Annex 2, *Systems Operation Data File Management Plan: Configuration Control Plan*. During mission execution, procedures are updated per Operational Interface Procedures (OIP) 5.2.1.1, *Operational Interface Procedures*.

Maintenance: N/A

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ATTACHMENT J-02 RESERVED

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ATTACHMENT J-03 ACRONYMS AND ABBREVIATIONS

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ACRONYM	ACRONYM DEFINED
ADA	Acquisition, Data and Analytics
AI&T	Assembly Integration and Test
APR	Assembly Integration and Test Progress Review
ATNF	Advance Travel Notification Form
ATP	Authority to Proceed
AVM	Acceptance Verification Matrix
BCC	Backup Control Center
BCWS	Budgeted Cost for Work Scheduled
BDEALS	Bilateral Data Exchange Agreements, Lists, and Schedules
BHSEALS	Bilateral Hardware and Software Exchange Agreements, Lists, and Schedules
CAD	Computer-Aided Design
CBCS	Computer Based Control System
CC	Control Center
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CHATS	Contractor-Held Asset Tracking System
CI	Configuration Identification
CISO	Center Chief Information Security Officer
CLIN	Contract Line Item Number
CM	Configuration Management
CO	Contracting Officer
CoFR	Certification of Flight Readiness
COMSEC	Communications Security
ConOps	Concept of Operations
COR	Contracting Officer Representative
COSMOS	Configuration Status Management Operations System
COTS	Commercial-Off-the-Shelf
CPD	Contract Performance Dataset
CSA	Configuration Status Accounting
CSCI	Computer Software Configuration Items
CTAT	Counter Threat Awareness Training
CUI	Control Unclassified Information
CWBS	Contract Work Breakdown Structure
DCN	Document Change Notice
DDT&E	Design, Development, Test, and Evaluation
DEIA	Diversity, Equity, Inclusion, and Accessibility

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DFMR	Design for Minimum Risk
DID	Data Item Description
DORR	Deorbit Readiness Review
DOS	Department of State
DR	Data Requirement
DRR	Dwell Release Review
DRD	Data Requirements Description
EAC	Estimate at Complete
EAR	Export Administration Regulations
eCC	Electronic Country Clearance
ECP	Export Control Plan
EDMS	Electronic Document Management System
EEE	Electrical, Electronic and Electromechanical
EMI/EMC	Electromagnetic Interference/Electromagnetic Compatibility
EOC	Element of Cost
eSRS	Electronic Subcontracting Reporting System
ETC	Estimate to Complete
EVMS	Earned Value Management System
FAR	Federal Acquisition Regulation
FACT	Foreign Affairs Counter Threat
FCT	Flight Control Team
FDIR	Fault Detection, Isolation, and Recovery
FFP	Firm Fixed Price
FMEA	Failure Modes and Effects Analysis
FOD	Flight Operations Directorate
FOD	Foreign Object Debris
FOR	Flight Operations Review
FPGA	Field Programmable Gate Arrays
FRR	Flight Readiness Review
FTC	Foreign Travel Coordinator
FY	Fiscal Year
G&A	General and Administrative
GAAP	Generally Accepted Accounting Principles
GFE	Government Furnished Equipment
GFY	Government Fiscal Year
GIDEP	Government-Industry Data Exchange Program
GNC	Guidance, Navigation, and Control
GPA	Government Property Administrator
GSE	Ground Support Equipment
GTA	Government Task Agreements

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GQA	Government Quality Assurance
GORR	Ground Operations Readiness Review
GOWG	Ground Operations Working Group
HA	Hazard Analysis
HITL	Hardware in the Loop
Hr	hour
HR	Hazard Report
HTSOS	High Threat Security Overseas Seminar
IBR	Integrated Baseline Review
ICD	Interface Control Document
IMP	Integrated Master Plan
IMS	Integrated Master Schedule
IPMDAR	Integrated Program Management Data Analysis Representative
IPMR	Integrated Program Management Report
IPT	Integrated Product Team
IRD	Interface Requirements Document
ISRP	ISS Safety Review Panel
ISS	International Space Station
I&T	Integration and Test
IP&CL	Instrumentation, Program, and Command List
IP/P	ISS Partners and Participants
IT	Information Technology
ITC	International Traveler Checklist
ITSP	IT Security Plan
ITAR	International Traffic in Arms Regulations
ITD	Inception to Date
ITSMP	Information Technology Security Management Plan
IV&V	Independent Verification and Validation
JIP	Joint Integration Plan
JIVTP	Joint Integration Verification and Test Plan
JSC	Johnson Space Center
JTRR	Joint Test Readiness Review
KSC	Kennedy Space Center
L-	Launch minus
LCC	Launch Commit Criteria
LRR	Launch Readiness Review
LRU	Line Replaceable Units
LSIP	Launch Site Integration Plan
LSIRD	Launch Service Interface Requirements Document
LSP	Launch Services Program

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LSSP	Launch Site Support Plan
LV	Launch Vehicle
MCC	Mission Control Center
MCC-H	Mission Control Center Houston
MCR	Mission Concept Review
MaxTTR	Max-Time-To-Repair
MCT	Mean-Corrective-Maintenance
MDT	Mean-Down-Time
MER	Mission Evaluation Room
MIT	Mission Integration Team
MIWG	Mission Integration Working Group
MMOD	Micrometeoroid Orbital Debris
MPT	Mean-Preventive-Maintenance-Time
MRB	Material Review Board
MSDS	Material Safety Data Sheets
MTBF	Mean-Time-Between-Failures
MTBME	Mean-Time-Between-Maintenance-Events
MTC	Mission Training Center
MTTF	Mean-Time-To-Fail
MTTR	Mean-Time-To-Repair
MUA	Material Usage Agreement
NAMS	NASA Account Management System
NANADARTS	NASA Advisory, Notices and Alerts, Distribution and Response Tracking System
NARS	NASA Advisory Reporting System
NCR	Non-Compliance Report
NDE	Non-destructive evaluation
NEPA	National Environmental Policy Act
NESS	NF Electronic Submission System
NF	NASA Form
NFS	NASA FAR Supplement
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
NRRS	NASA Records Retention Schedule
ODB	Operations Data Book
OCI	Organizational Conflict of Interest
OEM	Original Equipment Manufacturer
OGA	Other Government Agencies
OIP	Operations Interface Procedures
OMB	Office of Management and Budget

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OpNom	Operations Nomenclature
OPR	Office of Primary Responsibility
ORU	Orbital Replacement Unit
OSHA	Occupational Safety and Health Administration
OUSD	Office Under Secretary of Defense
PAA	Product Assurance Action
PLF	Payload Fairing
PDR	Preliminary Design Review
PFIP	Pre-Flight Imagery Plan
PMB	Performance Measurement Baseline
PMP	Program Management Plan
PMR	Program Management Review
POC	Proof of Concept
PP&E	Property, Plant & Equipment
PPBE	Program Planning, Budgeting, and Execution
PPF	Payload Processing Facility
PRA	Probabilistic Risk Assessment
PSR	Pre-Ship Review
QA	Quality Assurance
RBA	Risk-Based Analysis/Assessment
RC	Reporting Calendar
RF	Radio Frequency
RFA	Request for Action
RFP	Request for Proposal
RID	Review Item Discrepancy
RMP	Risk Management Plan
S&MA	Safety and Mission Assurance
SAR	System Acceptance Review
SARB	Software Acceptance Review Board
SDIL	Software Development & Integration Laboratory
SDP	Safety Data Package
SDR	System Definition Review
SDS	Safety Data Sheets
SEMP	System Engineering Management Plan
SIR	System Integration Review
SMP	Software Management Plan
SOC	Security Operations Center
SORR	Stage Operational Readiness Review
SOW	Statement of Work
SPD	Schedule Performance Dataset

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SRA	Schedule Risk Assessment
SRD	Systems Requirements Document
SRR	System Requirements Review
SRS	Software Requirements Specification
SMAP	S&MA Plan
STEP	Standard for the Exchange of Product Data
SVTL	Safety Verification Tracking Log
T&V	Test and Verification
TBD	To Be Determined
TIM	Technical Interchange Meeting
TMP	Technology Maturation Plan
TPM	Technical Performance Measures
TRL	Technology Readiness Level
UA	Unexplained Anomalies
USDV	United States Deorbit Vehicle
V&V	Verification and Validation
VCN	Verification Closure Notice
VPP	Voluntary Protection Program
WBS	Work Breakdown Structure
WIP	Work in Progress
WYE	Workforce Year Equivalent

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ATTACHMENT J-04 DEFINITIONS

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- **Acceptance Destination:** the Dwell Facility, if proceeding into Dwell; or the Launch Site Payload Processing Facility (LS PPF) if proceeding directly to launch.
- **Analysis:** the technical evaluation process of using techniques and tools, such as mathematical models and computer simulation, historical/design/test data, and other quantitative assessments to calculate characteristics and verify specification compliance. Analysis is used to verify requirements compliance, where established techniques are adequate to yield confidence, or where testing is impractical.
- **Anomaly:** An unexpected event, hardware damage, departure from established procedures or performance, operator error, or a deviation of system, subsystem, or hardware or software performance outside intended design or expected performance specification limits.
- **Authority to Proceed (ATP):** Notification from the Contracting Officer to proceed with work on a USDV Task Order. Only the Contracting Officer can bind the Government to give this Authority to Proceed.
- **Availability:** Minimize time between identification of crew member naming and system use, as well as between identification of operational need and system use
- **Baseline:** An agreed-to set of requirements, designs, products, services, or documents that will have changes controlled through a formal approval and monitoring process.
- **Collaboration:** The highest form of insight, where strong working relationships between the Contractor and NASA may provide increased assurance that a Contractor approach is acceptable to meeting the USDV requirements.
- **Compatibility:** Minimize impacts across existing vehicle interfaces/infrastructure and multiple vehicle interfaces
Corrective Action: Change to processes, work instructions, workmanship practices, training, inspection, tests, procedures, specifications, drawings, tools, equipment, facilities, resources, or material that result in preventing, minimizing, or eliminating nonconformances.
- **Concept of Operations (ConOps):** Developed early in Pre-Phase A, describes the overall high-level concept of how the system will be used to meet stakeholder expectations, usually in a time sequenced manner. It describes the system from an operational perspective and helps facilitate an understanding of the system goals. It stimulates the development of the requirements and architecture related to the user elements of the system. It serves as the basis for subsequent definition documents and provides the foundation for the long-range operational planning activities (for nominal and contingency operations). It provides the criteria for the validation of the system. In cases where an Operations Concept (OpsCon) is developed, the ConOps feeds into the OpsCon and they evolve together. The ConOps becomes part of the Concept Documentation.
- **Defect:** Any nonconformance of a characteristic with specified requirements or any state or condition of nonconformance to requirements.
- **Corrective Action:** Action taken to correct and preclude recurrence of a failure, anomaly, or process escape.
- **Demonstration:** is the qualitative determination of compliance with requirements by observation during actual operation or simulation under preplanned conditions and guidelines.
- **Entrance Criteria:** The minimum accomplishments and requirements the Contractor must fulfill prior to a life-cycle/milestone review. All entrance criteria for milestone reviews require NASA approval.
- **Exit Criteria:** The minimum accomplishments and requirements the Contractor must fulfill at completion of a life-cycle/milestone review. All exit criteria for milestone reviews require NASA approval.

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- **Firmware:** Software that provides basic machine instructions allowing hardware to function and communicate with other software running on a device. Firmware provides low-level control for a device's hardware.
- **Field Programmable Gate Arrays (FPGAs):** semiconductor devices that are based around a matrix of configurable logic blocks (CLBs) connected via programmable interconnects. FPGAs can be reprogrammed to desired application or functionality requirements after manufacturing.
- **Fit:** The ability of an item to physically interface or interconnect with or become an integral part of another item.
- **Form:** The defined configuration of an item including the geometrically measured configuration, density, and weight or other visual parameters which uniquely characterize an item, component, or assembly. For software, form denotes the language, language level and media.
- **Function:** The action or actions which an item is designed to perform.
- **Flight Support Equipment:** All equipment (in-flight check-out hardware, launch carriers and enclosures, in-flight stowage containers, servicing tools, etc.) required post launch to support in-flight operations and logistics.
- **Ground Support Equipment (GSE):** Nonflight equipment, systems, test equipment, or devices specifically designed and developed for a physical or direct functional interface with flight hardware. GSE is equipment whose failure could propagate into flight hardware or equipment that could prevent the failure of ground support systems and facility systems from propagating into flight hardware. Equipment used during the manufacturing of flight hardware is not considered to be GSE. Each program defines when manufacturing ends and processing of the flight hardware begins. If manufacturing equipment is to be used after flight hardware processing begins, it must be designed to meet GSE requirements. GSE does not include tools that are designed for general use and not specifically for use on flight hardware.
- **Implement:** To document and communicate the approved process, provide resources to execute the process, provide training on the process, and monitor and control the process.
- **Independent Evaluation:** is a process where an article (hardware, software, test procedure, etc.) being inspected or tested by a step within the procedure is validated/verified/witnessed by a person other than the individual accomplishing the work/task.
- **Inspection:** The examination and testing of supplies and services (including, when appropriate, raw materials, components, and intermediate assemblies) to determine compliance with specified requirements. Inspection uses standard methods such as visuals, gauges, etc., to verify compliance with requirements.
- **Leading Indicator:** A measure for evaluating the effectiveness of how a specific activity is applied on a program or project in a manner that provides information about impacts likely to affect the system performance objectives. A leading indicator may be an individual measure or collection of measures predictive of future system (and project) performance before the performance is realized. The goal of the indicators is to provide insight into potential future states to allow management to take action before problems are realized. A technical leading indicator is a subset of the Technical Performance Measures (TPMs) that provides insight into the potential future states.
- **Major nonconformance:**
 - A nonconformance with contract or configuration documentation requirements that could affect one

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of the following (1) safety (limited to rendezvous/docking, deorbit, interface, and associated support functions); (2) health; (3) performance; (4) interchangeability, reliability, survivability, or maintainability of the item or the repair parts; (5) effective use or operation; (6) weight; or (7) appearance (when a factor).

- A noncompliance to a requirement or constraint defined within a non-HW or non-system-specific ISS Program-level requirement, such as SSP 41170 or SSP 50261-01, Generic Groundrules, Requirements, and Constraints Part 1: Strategic and Tactical Planning.
- Accepts lost traceability on Electrical, Electronic and Electromechanical parts, as defined in SSP 30423, Space Station Approved Electrical, Electronic, and Electromechanical (EEE) Parts List, or hardware designated as “fracture critical” by the hardware design requirements, in accordance with SSP 30558, Fracture Control Requirements for Space Station.
- Maintenance - The function of keeping items or equipment in, or restoring them to, a specified operational condition. It includes servicing, test, inspection, adjustment/alignment, removal, replacement, access, assembly/disassembly, lubrication, operate, decontaminate, installation, fault location, calibration, condition determination, repair, modification, overhaul, rebuilding, and reclamation. Maintenance includes both preventive and corrective maintenance.
 - Preventative Maintenance – Maintenance that is regularly performed on equipment or a system to lessen the likelihood of failure. Preventive maintenance can be time-based, meaning the maintenance is performed routinely on a fixed schedule, or condition-based, meaning the maintenance is performed on contingency, depending upon the condition of the equipment or system.
 - Corrective Maintenance – Maintenance that involves repairing or replacing equipment that has stopped working or is damaged. Corrective maintenance activities include identifying, isolating, and rectifying a fault to restore the failed equipment, machine, or system to an operational condition.
- Material Review Board - The formal Board established for the purpose of reviewing, evaluating, and disposing of specific nonconforming supplies or services; and, for assuring the initiation and accomplishment of corrective action.
- Measure of Effectiveness (MOE): A measure by which a stakeholder’s expectations will be judged in assessing satisfaction with services, products or systems produced and delivered in accordance with the associated technical effort. An MOE is deemed to be critical to not only the acceptability of the product by the stakeholder but also critical to operational/mission usage. An MOE is typically qualitative in nature or not able to be used directly as a “design-to” requirement.
- Measure of Performance (MOP): A quantitative measure that, when met by the design solution, will help ensure that an MOE for a product or system will be satisfied. MOPs are given special attention during design to ensure that the MOEs with which they are associated are met. There are generally two or more measures of performance for each MOE.
- Minor nonconformance: A non-conformance which does not involve any of the factors defined as major. Minor waivers are approved via signature authority delegated by the ISS Program Manager.
- Mission Systems: The end-to-end terrestrial based hardware and software infrastructure, whether owned or operated by NASA or the contractor, supporting mission operations from the point of Radio Frequency (RF) receipt/transmit at RF communications ground sites, through associated data processing and distribution infrastructure, transport networks, mission control center systems and facilities, backup

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control center systems and facilities, interfaces between operations facilities, to the end user display/control systems and support infrastructure. Mission Systems include all associated hardware and software infrastructure supporting crew and flight controller training for operations, including but not limited to simulations, networks, mockups, and interfaces to support infrastructure.

- Contractor Mission Systems: Mission Systems provided by the contractor.
- NASA Mission Systems: Mission Systems provided by NASA.
- Noncompliance: A condition which results when one or more attributes of any article, item, part, supplies, product, material, or service do not comply with Program or Contract requirements, functional baseline or allocated baseline documentation.
- Nonconformance: A condition of any product or material in which one or more characteristics do not conform to its product baseline documentation. Conditions include failures, discrepancies, defects, and malfunctions.
- Objective evidence: The auditable, traceable, tangible proof derived from an authoritative source that endorsements have been met.
- Operability: Maximize ability to easily accomplish tasks in environment.
- Operational Environment: The environment in which the final product will be operated. In the case of space flight hardware/software, it is space. In the case of ground-based or airborne systems that are not directed toward space flight, it will be the environments defined by the scope of operations. For software, the environment will be defined by the operational platform.
- Operations Concept (OpsCon): Developed later in the life-cycle and baselined at PDR, a more detailed description of how the flight system and the ground system are used together to ensure that the concept of operation is reasonable. This might include how mission data of interest, such as engineering data, scientific data, and data standards/metadata are captured, returned to Earth, processed, made searchable, accessible, and available to users, and archived for future reference. The OpsCon describes how the flight system and ground system work together across mission phases for planning, training, launch, cruise, critical activities, science observations, and end of mission to achieve the mission. This product should be informed by the ConOps and they evolve together. They may exist as a single product or separate products.
- Oversight: An element of Government surveillance that occurs in line with the contractor's processes in which the Government retains and exercises the right to concur or non-concur with the contractor's decisions.
- Product Assurance Action (PAA): type of surveillance activity for detailed insight into Contractor/subcontractor safety critical attributes which originate from Risk-Based Analyses/Assessments (RBAs). Types of PAAs include, but not limited to:
 - Record review: Reviews the "as-run" process to verify the procedure or test results are as expected
 - Process witness: Witnesses the sequence of events in real-time to verify the procedure is as expected and must be conducted on USDV hardware
 - Process audit: Similar to a witness, but audits a mature process that is identical to the one to be performed on USDV hardware
 - Product examination: An inspection of USDV hardware at a discrete point along the build process; usually after completion

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- **Quality:** The composite of all the attributes or characteristics, including performance of an item or product that bear on its ability to satisfy stated or implied needs.
- **Quality Assurance:** A planned and systematic pattern of all actions necessary to provide adequate confidence that the item or product conforms to established technical requirements.
- **Radio Frequency Authorization:** Given by the National Telecommunications and Information Administration (NTIA) for the use of radio frequency spectrum for radio transmissions for telecommunications or for other purposes.
- **Repair:** Operations performed on a nonconforming article or material which reduces but does not completely eliminate a nonconformance to place the article or material in a usable and acceptable condition; requires review and concurrence by an authorized Material Review Board, additional written procedures and additional operations.
- **Request for Action/Review Item Discrepancy (RFA/RID):** The most common names for the comment forms that reviewers submit during life-cycle reviews that capture their comments, concerns, and/or issues about the product or documentation.
- **Resilience:** Resilience is the ability of an organization to adjust its functioning prior to, during, or following changes and disturbances, so that it can sustain required operations under both expected and unexpected conditions. Resilience as network architectures that can sustain the ability to adapt to future surprises as conditions evolve.
- **Resilient:** Durable, flexible, sturdy, tough, quick to recover, elastic, capable of withstanding shock without permanent deformation, yields (signs of approaching boundaries) before failure.
- **Rework:** The procedure applied to articles and materials that will completely eliminate the nonconformance and result in complete conformance to drawings, specifications, procedures, contract or bilateral agreement. Requires only normal operations to complete the article or material in accordance with the applicable documents and does not require additional written procedures.
- **Risk-Based Analysis/Assessment (RBA):** A systematic evaluation of a set of risk and quality driven criteria that assesses safety-critical attributes based on their associated risks.
- **Safety Critical Functions:** These functions include but are not limited to:
 - Functions needed for successful rendezvous and docking (Attitude control and Translational maneuvers, Guidance Navigation and Control (GNC) (including control laws and gains), Relative GNC, and associated support functions
 - Functions needed for successful deorbit operations (Attitude control and Translational maneuvers, GNC (including control laws and gains), and associated support functions)
- **Single Point Failure:** An independent element of a system (hardware, software, or human), the failure of which would result in loss of objectives, hardware, or crew.
- **Specification:** A document or data that prescribes, in a complete, precise, verifiable manner, the requirements, design, behavior, or characteristics of a system or system component. In this document, specification is treated as a requirement.
- **Subsystem:** A specific set of hardware and/or software functional entities and their associated interconnections (such as cables or tubing) that perform a single category of functions (e.g., electrical power, guidance and navigation, attitude control, telemetry, thermal control, propulsion, structures subsystems). The functional level immediately below the system level.

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- **Success Criteria:** Specific accomplishments that need to be satisfactorily demonstrated to meet the objectives of a life-cycle and technical review so that a technical effort can progress further in the life-cycle. Success criteria are documented in the corresponding technical review plan.
- **Sustainability:** Minimize logistics and crew preparation time.
- **System:** The combination of elements that function together to produce the capability required to meet a need. The elements include all hardware, software, equipment, facilities, personnel, processes, and procedures needed for this purpose. (Refer to NPR 7120.5.)
- **Systems Engineering Management Plan (SEMP):** The SEMP identifies the roles and responsibility interfaces of the technical effort and how those interfaces will be managed. The SEMP is the vehicle that documents and communicates the technical approach, including the application of the common technical processes; resources to be used; and key technical tasks, activities, and events along with their metrics and success criteria.
- **Test:** is actual operation of equipment, normally instrumented, under simulated or flight equivalent conditions or the subsection of parts or equipment to specified environments to measure and record responses in a quantitative manner.
- **Technology Readiness Level (TRL)**
 - **TRL 1:** Basic principles observed and reported. This is the lowest “level” of technology maturation. At this level, scientific research begins to be translated into applied research and development. Success criteria for achieving this readiness level is peer reviewed documentation of research underlying the proposed concept/application.
 - **TRL 2:** Technology concept and/or application formulated. Once basic physical principles are observed, then at the next level of maturation, practical applications of those characteristics can be ‘invented’ or identified. At this level, the application is still speculative: there is not experimental proof or detailed analysis to support the conjecture. Success criteria for achieving this readiness level is documented description of the application/concept that addresses feasibility and benefit.
 - **TRL 3:** Analytical and experimental critical function and/or characteristic proof of concept. At this step in the maturation process, active research and development (R&D) is initiated. This must include both analytical studies to set the technology into an appropriate context and laboratory-based studies to physically validate that the analytical predictions are correct. These studies and experiments should constitute “proof-of-concept” validation of the applications/concepts formulated at TRL 2. Success criteria for achieving this readiness level is documented analytical/experimental results validating predictions of key parameters.
 - **TRL 4:** Component and/or breadboard validation in laboratory environment. Following successful “proof-of-concept” work, basic technological elements must be integrated to establish that the “pieces” will work together to achieve concept-enabling levels of performance for a component and/or breadboard. This validation must be devised to support the concept that was formulated earlier and should also be consistent with the requirements of potential system applications. The validation is relatively “low-fidelity” compared to the eventual system: it could be composed of ad hoc discrete components in a laboratory. Success criteria for achieving this readiness level is documented test performance demonstrating agreement with analytical predictions and documented definition of potentially relevant environment.
 - **TRL 5:** Component and/or breadboard validation in relevant environment. At this level, the fidelity of the component and/or breadboard being tested has to increase significantly. The basic

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technological elements must be integrated with reasonably realistic supporting elements so that the total applications (component-level, sub-system level, or system-level) can be tested in a “simulated” or somewhat realistic environment so as to demonstrate overall performance in critical areas. Success criteria for achieving this readiness level is documented test performance demonstrating agreement with analytical predictions and documented definition of scaling requirements. Performance predictions are made for subsequent development phases.

- TRL 6: System/subsystem model or prototype demonstration in a relevant environment (ground or space). A major step in the level of fidelity of the technology demonstration follows the completion of TRL 5. At TRL 6, a representative high-fidelity model or prototype system or system – which would go well beyond ad hoc, ‘patch-cord’ or discrete component level breadboarding – would be tested in a relevant environment. At this level, if the only ‘relevant environment’ is the environment of space, then the model/prototype must be demonstrated in space. Success criteria for achieving this readiness level is documented test performance demonstrating agreement with analytical predictions.
- TRL 7: System prototype demonstration in a space environment. TRL 7 is a significant step beyond TRL 6, requiring an actual system prototype demonstration in a space environment. The prototype should be near or at the scale of the planned operational system and the demonstration must take place in space. Success criteria for achieving this readiness level is documented test performance demonstrating agreement with analytical predictions.
- TRL 8: Actual system completed and “flight qualified” through test and demonstration (ground or space). In almost all cases, this level is the end of true “system development” for most technology elements. This might include integration of new technology into an existing system. Success criteria for achieving this readiness level is documented test performance verifying analytical predictions.
- TRL 9: Actual system ‘flight-proven’ through successful mission operations. In almost all cases, the end of last ‘bug fixing’ aspects of true ‘system development’. This might include integration of new technology into an existing system. This TRL does not include planned product improvement of ongoing or reusable systems. Success criteria for achieving this readiness level is documented mission operational results.
- Technical Performance Measures: The set of performance measures that are monitored by comparing the current actual achievement of the parameters with that anticipated at the current time and on future dates. Used to confirm progress and identify deficiencies that might jeopardize meeting a system requirement. Assessed parameter values that fall outside an expected range around the anticipated values indicate a need for evaluation and corrective action. Technical performance measures are typically selected from the defined set of MOPs.
- Technical Requirements: The requirements that capture the characteristics, features, functions, and performance that the end product will have to meet stakeholder expectations.
- USDV System: The vehicle required to meet SSP 51101, *USDV SRD*
- Vacuum perigee: The perigee without considering atmospheric perturbations
- Validation: The process of showing proof that the product or service accomplishes the intended purpose based on stakeholder expectations and the ConOps. May be determined by a combination of test, analysis, demonstration, and inspection.
- Verify: To inspect, test, check, audit, review recorded data (inspection, test, etc.) to establish and document the conformance of items, processes, services, or documents to

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specifications, drawing requirements, etc.

- **Verification:** A process, which determines that the hardware and software systems meet all design, performance, and safety requirements. The verification process includes analysis, test, inspection, demonstration, or a combination thereof.
- **Witness:** To observe a test or process in person to verify that correct procedures and processes are followed for a specific action.

Note: Additional definitions can be found within the various applicable and reference documents in Attachment J-05.

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**ATTACHMENT J-05 APPLICABLE AND REFERENCE
DOCUMENTS LIST**

PART II – CONTRACT CLAUSES**TABLE ATTACHMENT J-05-01 APPLICABLE DOCUMENTS LIST (ADL)**

Document Number	Document Revision Document Date	Document Title
ANSI ESD S20.20-2021	2021 Edition	Protection Of Electrical And Electronic Parts, Assemblies And Equipment (Excluding Electrically Initiated Explosive Devices)
ANSI Z136.1-2022	2022 Edition	The American National Standard for Safe Use of Lasers
AS9100	D 2017	Quality Management Systems - Requirements for Aviation, Space, and Defense Organizations
AS9115	A	Quality Management System – Requirements for Aviation, Space and Defense Organizations – Deliverable Software (Supplement to 9100:2016)
ASTM Manual 36	2nd Edition	Safe Use of Oxygen and Oxygen Systems: Handbook for Design, Operation, and Maintenance: Second Edition
DI-MGMT-81861	C	Data Item Description (DID), Integrated Program Management Data and Analysis Report (IPMDAR) Including Data Exchange Instructions for Contract Performance Dataset (CPD) and Schedule Performance Dataset (SPD)
EIA-748	D January 2019	Earned Value Management Systems
Executive Order 13985		Advancing Racial Equity and Support for Underserved Communities Through the Federal Government
FIPS Pub 140-2	w/ Changes 1-4 December 2002	Security Requirements for Cryptographic Modules
FIPS Pub 140-3	March 2019	Security Requirements for Cryptographic Modules

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Document Number	Document Revision Document Date	Document Title
FIPS Pub 197	Updated May 2023	Advanced Encryption Standard (AES)
GEIA-STD-0005-2	A May 2012	Standard for Mitigating the Effects of Tin Whiskers in Aerospace and High Performance Electronics
GSFC-STD-8009	Baseline June 2019	Goddard Space Flight Center (GSFC) Wallops Flight Facility Range Safety Manual (RSM)
IPC-2220 Series per Performance Class 3	Fully Applicable per Performance Class 3 2221: B 2222: B 2223: E 2225: B/L 2226: A 2228: B/L	Family of Printed Board Design Documents
IPC-6010 Series	Fully Applicable 6011: B/L 6012: E w/ Amendment 1 and Space Addendum 6013: E 6015: B/L 6017: A 6018: DS	Family of Printed Board Performance Documents
IPC-CM-770	E January 2004	Component Mounting Guidelines For Printed Boards
IPC-J-STD-001HS	2021	Space And Military Applications Electronic Hardware Addendum To IPC J-STD-001H Requirements For Soldered Electrical And Electronic Assemblies
ISO 14644-1:2015	2nd Edition December 2015	Cleanrooms and Associated Controlled Environments, Part 1: Classification of air cleanliness by particle concentration.
ISS_OE_906	2021	Flight Safety Certificate Form
ITS-HBK-CUI	Version 2.0.0 December 2022	Controlled Unclassified Information Handbook

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Document Number	Document Revision Document Date	Document Title
JAI 2190.1	E	Export Services Team Operations Manual
JF288	June 2007	Statistical Information - Contractor Safety and Health Program
JPD 8500.1	B October 2020	JSC Environmental Excellence Policy
JPR 1040.4	A, with Admin Change 1 December 2020	JSC Emergency Management Plan
JPR 1700.1	L, with Change 4 December 2018	JSC Safety and Health Requirements
JPR 2310.1	B	JSC Knowledge Management Strategy
JPR 8550.1	C 2021	JSC Environmental Compliance Procedural Requirements
JPR 8553.1	C, Revalidated March 2019	JSC Environmental Management System Manual
JSC 12820	Current Revision	ISS Generic Operational Flight Rules, Volume B, Appendix B – Change Control
JSC 20793	D March 2017	Crewed Space Vehicle Battery Safety Requirements
JSC 35194	A	Mission Training Center Generic Simulation Interface Specification
JSC 36054	F	Systems Operation Data File (SODF) Management Plan (main book and Annexes 1-4)
JSC 36054 Annex 1	H	SODF Definition
JSC 36054 Annex 2	J	SODF Configuration Control Plan
JSC 36054 Annex 3	K	SODF Procedure Validation Plan
JSC 36054 Annex 4	J	SODF Preparation and Publication Plan
JSC 62809	E June 2022	Human Rated Spacecraft Pyrotechnic Specification
JSC 65795	M	NASA Docking System (NDS) Interface Definitions Document (IDD)

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Document Number	Document Revision Document Date	Document Title
JSC 65828	B w/ Change 1 July 2014	Structural Design Requirements and Factors of Safety for Spaceflight Hardware
JSC 66617	September 2013	ISS Passive Thermal Control Systems (PTCS) Analysis Guide
JSC 67035	A	Best Practices and Guidelines (BP&G) for Thin Wall Pressure Boundaries (TWPB) for Human Spaceflight Applications
JWI 1040.26	B March 2021	Hazardous Substance Spill/Release Response
JWI 2190.1	E August 2019	JSC Export Compliance
JWI 8553.1	B, Revalidated May 2021	EMS Aspect/Impact Assessment and EMP Process
KNPR 8715.3	L	KSC Safety Procedural Requirements
KSC-DE-512-SM	M November 2021	Facility Systems, Ground Support Systems, and Ground Support Equipment General Design Requirements
LSP-PD-120.05	B	Launch Telemetry Requirements
MGT-OA-019	B	On-Orbit Anomaly Resolution Process Work Instruction
MIL-PRF-38534	L December 2019	Hybrid Microcircuits, General Specification For
MIL-PRF-38535	M November 2022	Integrated Circuits (Microcircuits) Manufacturing, General Specification for
MIL-STD-1553	Rev. B Notice 2 September 8, 1986	Digital Time Division Command/Response Multiplex Data Bus
MSFC-SPEC-3746	Baseline April 2020	Flow-Induced Vibration Assessment Requirements for Metal Bellows and Flex hoses
NAII 2190.1	H September 2021	NASA Export Control Program Operations Manual
NASA JSC SN-C-0005	Rev D July 1998	Contamination Control Requirements

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Document Number	Document Revision Document Date	Document Title
NASA/TM-2020-220555	January 2020	NASA Meteoroid Engineering Model (MEM) Version 3
NASA/TP-2019-220448	December 2019	NASA Orbital Debris Engineering Model ORDEM 3.1 – Software User Guide
NASA-STD-2818	4.0 June 2015	Digital Television Standards for NASA
NASA-STD-2822	Baseline September 2013	Still and Motion Imagery Metadata Standard
NASA-STD-4005	A w/ Change 1 November 2021	Low Earth Orbit Spacecraft Charging Design Standard
NASA-STD-5005	D w/ Change 1 October 2017	Standard for the Design and Fabrication of Ground Support Equipment
NASA-STD-5012	B June 2016	Strength and Life Assessment Requirements for Liquid-Fueled Space Propulsion System Engine
NASA-STD-5017	B December 2022	Design and Development Requirements for Mechanisms
NASA-STD-5019	A w/ Change 3 August 2020	Fracture Control Requirements for Spaceflight Hardware
NASA-STD-5020	B August 2021	Requirements for Threaded Fastening Systems in Spaceflight Hardware
NASA-STD-6016	C September 2021	Standard Materials and Processes Requirements for Spacecraft

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Document Number	Document Revision Document Date	Document Title
NASA-STD-7009	A, with Change 1 December 2016	Standard for Models and Simulations
NASA-STD-7012	A February 2023	Leak Test Requirements
NASA-STD-8719.14	C November 2021	Process for Limiting Orbital Debris
NASA-STD-8719.24	A March 2022	NASA Payload Safety Requirements
NASA-STD-8739.1	B w/ Change 2 October 2021	Workmanship Standard for Polymeric Application on Electronic Assemblies
NASA-STD-8739.4	A w/ Change 4 April 2022	Workmanship Standard For Crimping, Interconnecting Cables, Harnesses, And Wiring
NASA-STD-8739.5	A w/ Change 2 October 2021	Workmanship Standard for Fiber Optic Terminations, Cable Assemblies, and Installation
NASA-STD-8739.6	B February 2021	Implementation Requirements for NASA Approved Workmanship Standards
NASA-STD-8739.8	B September 2022	Software Assurance and Software Safety
NF1018	December 2022	NF1018 Electronic Submission System (NESS) NASA Property in the Custody of Award Recipients
NIST SP 800-57	Part 1: Rev 5, May 2020 Part 2: Rev 1, May 2019	Recommendation for Key Management – Part 1: General and and Part 2: Best Practices for Key Management Organizations
NPD 1440.6	I September 2014	NASA Records Management
NPD 2190.1	B w/ Change 2	NASA Export Control Program
NPD 2810.1	F	NASA Information Security Policy
NPD 8500.1	C w/ Change 2 October 2018	NASA Environmental Management
NPD 8610.23	C, Revalidated June 2023	Launch Vehicle Technical Oversight Policy

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Document Number	Document Revision Document Date	Document Title
NPD 8610.24	C, Revalidated December 2020	Launch Services Program (LSP) Pre-Launch Readiness Reviews
NPD 8610.7	D w/ Change 3	NASA Launch Services Risk Mitigation Policy for NASA- Owned and/or NASA-Sponsored Payloads/Missions
NPR 1441.1	E w/ Change 3	NASA Records Management Program Requirements
NPR 1600.1	A w/ Change 1	NASA Security Program Procedural Requirements
NPR 2190.1	C	NASA Export Control Program
NPR 2810.1	F	Security of Information and Information Systems
NPR 2810.7	Baseline	Controlled Unclassified Information
NPR 6000.1	H	Requirements for Packaging, Handling, and Transportation for Aeronautical and Space Systems, Equipment, and Associated Components
NPR 7123.1	D	NASA System Engineering Processes and Requirements
NPR 7150.2	D	NASA Software Engineering Requirements
NPR 8530.1	B August 2016	NASA Sustainable Acquisitions
NPR 8553.1	C July 2020	NASA Environmental Management Program
NPR 8570.1	B August 2020	NASA Energy and Water Management Program
NPR 8580.1	A w/ Change 1 September 2017	NASA National Environmental Policy Act (NEPA) Management Requirements
NPR 8621.1	D w/ Change 4	NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating and Recordkeeping
NPR 8715.7	B	Payload Safety Program
NPR 8735.2	C w/ Change 2	Hardware Quality Assurance Program Requirements for Programs and Projects

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Document Number	Document Revision Document Date	Document Title
NPR 9501.2	E w/ Change 4	NASA Contractor Financial Management Reporting
NRRS 1441.1	Updated June 2023	NASA Records Retention Schedules
OB-MER-006	F	ISS MER Support Definition Document
OB-MER-035	A	ISS MER Notification, On Call and Scheduling Requirements
OIP 5.2.1.1		Operations Interface Procedures
OMB Circular A-130		Managing Information as a Strategic Resource
OSHA CSP 03-01-005		Voluntary Protection Program (VPP): Policies and Procedures Manual
SAE-AS-7928	Rev. C May 2019	Terminals, Lug: Splices, Conductor: Crimp Style, Copper, General Specification for
SMC-S-016	September 2014	Test Requirements for Launch, Upper-Stage, and Space Vehicles
SSCMAN 91-710 (Volumes 1-7)	December 2022	Range Safety User Requirements Manual
SSP 30219	K	Space Station Reference Coordinate Systems Document
SSP 30234	H	Failure Modes and Effects Analysis and Critical Items List Requirements for Space Station
SSP 30237	T January 2012 w/ errata August 2018	Space Station Electromagnetic Emission and Susceptibility Requirements
SSP 30240	H September 2010	Space Station Grounding Requirements
SSP 30242	K December 2011	Space Station Cable/Wire Design and Control Requirements for Electromagnetic Compatibility
SSP 30243	N December 2011	Space Station Requirements for Electromagnetic Compatibility
SSP 30245	P January 2012	Space Station Electrical Bonding Requirements

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Document Number	Document Revision Document Date	Document Title
SSP 30309	F October 2009 w/ errata August 2018	Safety Analysis and Risk Assessment Requirements Document
SSP 30312, Volume I	L	Electrical, Electronic, and Electromechanical (EEE) Parts Management and Implementation Plan for the Space Station Program -
SSP 30423	L	Space Station Approved Electrical, Electronic, and Electromechanical (EEE) Parts List
SSP 30425	B May 1994 w/ errata October 2020	Space Station Program Natural Environment Definition for Design
SSP 30426	D w/ DCN 001 January 1994	Space Station External Contamination Control Requirements
SSP 30482, Volume 1	C July 1997	Electrical Power Specifications and Standards Volume 1: EPS Electrical Performance Specifications
SSP 30512	C June 1994 w/ errata August 2018	Space Station Ionizing Radiation Design Environment
SSP 30558	C August 2001 w/ errata August 2018	Fracture Control Requirements for Space Station
SSP 30559	D February 2008 w/ errata August 2018	Structural Design and Verification Requirements
SSP 30599	F	Safety Review Process
SSP 30695	C	Acceptance Data Package Requirements Specification

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Document Number	Document Revision Document Date	Document Title
SSP 41167	J March 2016	Mobile Servicing System Segment Specification for the International Space Station Program
SSP 41170	F	Configuration Management Requirements
SSP 41173	D	Space Station Quality Assurance Requirements
SSP 50005	H April 2020	International Space Station Flight Crew Integration Standard (NASA-STD-3000/T)
SSP 50036	C April 2003 w/ errata October 2020	Microgravity Control Plan
SSP 50038	C	Computer-Based Control System Safety Requirements
SSP 50108	G	ISS Program Certification of Flight Readiness Process Document
SSP 50123	E	Configuration Management Handbook
SSP 50175	F	ISS Risk Management Plan
SSP 50190	F	Contingency Action Plan
SSP 50252	T	Operations Data File Standards
SSP 50254	V	Operations Nomenclature (OpNom)
SSP 50290	E May 2007	Prime Item Development Specification for Node 2
SSP 50482	E	ISS Program Software Management Plan
SSP 50502	C	International Space Station Hardware Preflight Imagery Requirements
SSP 50714	G	Data Integration Standards
SSP 50808	G	International Space Station (ISS) to Commercial Orbital Transportation Services (COTS) Interface Requirements Document (IRD)

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Document Number	Document Revision Document Date	Document Title
SSP 50892	B	Ethernet Requirements for Interoperability with the Joint Station LAN (JSL)
SSP 50902	B	Transportation Integration Office Certification of Flight Readiness Implementation Plan
SSP 50934 Part 1	A January 2014 w/ PIRN 50934-NA-0002 PIRN 50934-NA-0003 PIRN 50934-NA-0005A	Common Communications for Visiting Vehicles (C2V2) Radio Frequency (RF) Interface Control Document (ICD)
SSP 50949	A	International Space Station Configuration Document
SSP 50974	Baseline July 2016	International Space Station Onboard IT Security Requirements for USOS Systems
SSP 51101	Baseline w/ SSCD 16863 and 16887 November 2023	U.S. Deorbit Vehicle Systems Requirements Document
SSP 51105	Baseline April 2024	U.S. Deorbit Vehicle Integration Plan
SSP 51721	Baseline September 2019	ISS Safety Requirements Document
SSP 52051, Volume 1	B September 2013	User Electric Power Specifications and Standards Volume 1: 120 Volt DC Loads
SSQ 21635	R w/ errata August 2018	General Specification for Connectors and Accessories, Electrical, Circular, Miniature, Intravehicular (IVA)/Extravehicular (EVA)/Robot Compatible, Space Quality
SSQ 21652	J March 2019	Wire, Electric, Silicon-Insulated, Nickel-Coated Copper, Space Quality, General Specification for

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Document Number	Document Revision Document Date	Document Title
SSQ 21655	J February 2018	Cable, Electrical, MIL-STD-1553B Notice 2 Data Bus, Space Quality, General Specification for
SSQ 21676	C w/ DCN 001 March 2004	Coupler, Data Bus, MIL-STD-1553B Notice 2, Space Quality, General Specification
SSQ 22680	M February 2018	Connectors, Rectangular, (ORU), Space Quality, General Specification For

PART II – CONTRACT CLAUSES**TABLE ATTACHMENT J-05-02 REFERENCE DOCUMENTS LIST (RDL)**

Document Number	Document Revision Document Date	Document Title
CCT-STD-1140		Crew Transportation Technical Standards and Design Evaluation Criteria
CPIA Pub 655	1997	Combustion Stability Specifications and Verification Procedures for Liquid Propellant Rocket Engines
EG-ISS-17-003	2017	ISS GNC System Requirements and Performance Characterization for Visiting Vehicles
EID683-98901	C	NDSB I Engineering Data Package
JSC 08080-2	B September 2015	JSC Design and Procedural Standards
KHB-50009		Space Station Processing Facility Processing and Support Capabilities
NASA/SP-2016-6105	Rev 2 February 2017	NASA Systems Engineering Handbook
NASA/SP-20210023927	Rev D November 2021	NASA Work Breakdown Structure (WBS) Handbook
NASA/TM-2008-215126/Vol I NESC-RP-06-108/05-173-E	April 2008	Design, Development, Test and Evaluation (DDT&E) Considerations for Safe and Reliable Human Rated Spacecraft Systems
NASA-TM-2008-215126 Vol II NESC-RP-06-108 05-173-E Part 2	April 2008	Design, Development, Test and Evaluation (DDT&E) Considerations for Safe and Reliable Human Rated Spacecraft Systems

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Document Number	Document Revision Document Date	Document Title
NPD 7120.4	E	NASA Engineering and Program/Project Management Policy
NPR 7120.5	F w/ Change 1	NASA Space Flight Program and Project Management Requirements
NPR 7120.7	A	NASA Information Technology Program and Project Management Requirements
NPR 7120.8	A w/ Change 2	NASA Research and Technology Program and Project Management Requirements
OCE-52	January 2021	NASA Common Leading Indicators Detailed Reference Guide
SMC-S-025	July 2017	Evaluation And Test Requirements For Liquid Rocket Engines
SSP 50934 ANXA		Common Communications for Visiting Vehicles (C2V2) Radio Frequency (RF) Interface Control Document (ICD), Annex A
SSP 50934 Part 2		Common Communications for Visiting Vehicles (C2V2) Radio Frequency (RF) Interface Control Document (ICD)
	September 2023	ISS Deorbit Concept of Operations
	October 2023	USDV Launch Vehicle Summary

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ATTACHMENT J-06 PROGRAM MANAGEMENT PLAN

(Final plan, as approved, incorporated post-Contract Award)

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**ATTACHMENT J-07 PROJECT LIFE-CYCLE REVIEW
PLAN**

(Final plan, as approved, incorporated post-Contract Award)

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**ATTACHMENT J-08 USDV SYSTEM ARCHITECTURE AND
CONCEPT OF OPERATIONS**

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ATTACHMENT J-09 INSIGHT MANAGEMENT PLAN

(Final plan, as approved, incorporated post-Contract Award)

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**ATTACHMENT J-10 ORGANIZATIONAL CONFLICTS OF
INTEREST (OCI) PLAN**

(Final plan, as approved, incorporated post-Contract Award)

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**ATTACHMENT J-11 SMALL BUSINESS SUBCONTRACTING
PLAN**

(as proposed by Offeror)



80JSC023R0003

PROPOSAL TO NASA FOR

INTERNATIONAL SPACE STATION UNITED STATES DEORBIT VEHICLE

ATTACHMENT J-11: SMALL BUSINESS SUBCONTRACTING PLAN

MARCH 4, 2024

(b) (4)

SR. PROGRAM DEVELOPMENT MANAGER

(b) (4), (b) (6)

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**ATTACHMENT J-12 DIVERSITY, EQUITY, INCLUSION, AND
ACCESSIBILITY (DEIA) PLAN**

(Final plan, as approved, incorporated post-Contract Award)

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**ATTACHMENT J-13 CONFIGURATION MANAGEMENT
PLAN**

(Final plan, as approved, incorporated post-Contract Award)

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**ATTACHMENT J-14 INFORMATION TECHNOLOGY
SECURITY MANAGEMENT PLAN (ITSMP)**

(Final plan, as approved, incorporated post-Contract Award)

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ATTACHMENT J-15 EXPORT CONTROL PLAN

(Final plan, as approved, incorporated post-Contract Award)

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**ATTACHMENT J-16 GOVERNMENT PROPERTY
MANAGEMENT PLAN**

(Final plan, as approved, incorporated post-Contract Award)

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ATTACHMENT J-17 SAFETY AND HEALTH PLAN

(Final plan, as approved, incorporated post-Contract Award)

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ATTACHMENT J-18 RISK MANAGEMENT PLAN (RMP)

(Final plan, as approved, incorporated post-Contract Award)

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**ATTACHMENT J-19 SAFETY & MISSION ASSURANCE
(S&MA) PLAN**

**(Initial incorporated into the Model Contract, Final plan, as
approved, incorporated post-Contract Award)**



80JSC023R0003

PROPOSAL TO NASA FOR

INTERNATIONAL SPACE STATION UNITED STATES DEORBIT VEHICLE

ATTACHMENT J-19: SAFETY AND MISSION ASSURANCE PLAN, VOLUME I

MAY 14, 2024

(b) (4)

SR. PROGRAM DEVELOPMENT MANAGER

(b) (4), (b) (6)

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PART II – CONTRACT CLAUSES

**ATTACHMENT J-20 MISHAP PREPARDNESS AND
CONTENGENCY PLAN**

(Final plan, as approved, incorporated post-Contract Award)

PART II – CONTRACT CLAUSES

**ATTACHMENT J-21 TRL ASSESSMENT AND TECHNOLOGY
MATURATION PLAN**

**(Initial incorporated into the Model Contract, Final plan, as
approved, incorporated post-Contract Award)**



80JSC023R0003

PROPOSAL TO NASA FOR

INTERNATIONAL SPACE STATION UNITED STATES DEORBIT VEHICLE

ATTACHMENT J-21: TRL ASSESSMENT AND TECHNOLOGY MATURATION PLAN

MARCH 4, 2024

(b) (4)

SR. PROGRAM DEVELOPMENT MANAGER

(b) (4)

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- (i) Use (except for manufacture) by support service Contractors
- (ii) Evaluation by nongovernment evaluators.
- (iii) Use (except for manufacture) by other contractors participating in the Government's program of which the specific contract or agreement is a part.
- (iv) Emergency repair or overhaul work.



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PART II – CONTRACT CLAUSES

ATTACHMENT J-22 SOFTWARE MANAGEMENT PLAN

(Final plan, as approved, incorporated post-Contract Award)

PART II – CONTRACT CLAUSES

**ATTACHMENT J-23 DESIGN, DEVELOPMENT, TEST, AND
EVALUATION (DDT&E) PLAN**

**(Initial incorporated into the Model Contract, Final plan, as
approved, incorporated post-Contract Award)**



80JSC023R0003

PROPOSAL TO NASA FOR

INTERNATIONAL SPACE STATION UNITED STATES DEORBIT VEHICLE

ATTACHMENT J-23: DESIGN, DEVELOPMENT, TEST, AND EVALUATION PLAN

MARCH 4, 2024

(b) (4)

SR. PROGRAM DEVELOPMENT MANAGER

(b) (4), (b) (6)

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PART II – CONTRACT CLAUSES

**ATTACHMENT J-24 VERIFICATION AND VALIDATION
(V&V) PLAN**

(Final plan, as approved, incorporated post-Contract Award)

PART II – CONTRACT CLAUSES

**ATTACHMENT J-25 SYSTEM ENGINEERING
MANAGEMENT PLAN (SEMP)**

(Final plan, as approved, incorporated post-Contract Award)

PART II – CONTRACT CLAUSES

**ATTACHMENT J-26 ASSEMBLY, INTEGRATION, AND TEST
(AI&T) PLAN**

(Final plan, as approved, incorporated post-Contract Award)

PART II – CONTRACT CLAUSES

**ATTACHMENT J-27 NASA STANDARDS AND
SPECIFICATIONS COMPLIANCE AND TAILORING
APPROACH**

(Final approach, as approved, incorporated post-Contract Award)

PART II – CONTRACT CLAUSES

**ATTACHMENT J-28 QUALIFICATION AND ACCEPTANCE
PLAN**

**(Initial incorporated into the Model Contract, Final plan, as
approved, incorporated post-Contract Award)**



80JSC023R0003

PROPOSAL TO NASA FOR

INTERNATIONAL SPACE STATION UNITED STATES DEORBIT VEHICLE

ATTACHMENT J-28: QUALIFICATION AND ACCEPTANCE PLAN

MARCH 4, 2024

(b) (4)

SR. PROGRAM DEVELOPMENT MANAGER

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PART II – CONTRACT CLAUSES

ATTACHMENT J-29 INTEGRATED MASTER SCHEDULE

(IMS incorporated post-Contract Award)

PART II – CONTRACT CLAUSES

ATTACHMENT J-30 WORK PLANS

(as proposed by Offeror)

PART II – CONTRACT CLAUSES

Work Plan Instructions and Guidance

Payment Number: the milestone (MS) payment number is provided for administrative purposes only.

Milestone: describes the event for which Firm Fixed Price milestones and Contractor Interim Milestones will be paid, pursuant to clauses H.13, Payments, Events, and Accomplishment Criteria and I.14, Performance-Based Payments.

Contractual Due Date: baselines the schedule contractual due dates for each Milestone or Project Lifecycle Reviews. For the USDV solicitation, Offerors shall fill-in all “OFI”s with the proposed completion dates relative to the established reference milestone (“MS#”) or Authority to Proceed (ATP) date (“A”).

Accomplishment Criteria: the evidence of completion that shall be submitted by the Contractor to demonstrate successful completion of each Milestone. All criteria must be submitted with supporting evidence of completion prior to submission of an invoice for payment of the Program Event, pursuant to clauses H.13, Payments, Events, and Accomplishment Criteria and I.14, Performance-Based Payments.

Payment Percentage for Milestone (cumulative): The payment percent that will be applied to the overall total CLIN value, pursuant to this clause.

Payment Amount: The Payment Amount is the value of the CLIN order (either from the Section B pricing or based on negotiated settlement) as applied to the “Payment Percentage for Milestone” to calculate the payment value for the specific milestone.

Contractor Additional Interim Milestones: The proposed additional interim milestones shall include the following items: definition, stated deliverables, scope, rationale, acceptance criteria for each Contractor proposed additional interim milestone. Proposed Milestones shall be in accordance with H.13, Payments, Events, and Accomplishment Criteria and I.14, Performance-Based Payments. The level of detail shall be equivalent to the level of detail in SOW, Section C4.0 for the mandatory milestones. Each Contractor proposed interim milestone is required to have a jointly agreed to JIP, which includes the interim milestone entrance and exit criteria.



NOTICE ID: 80JSC023R0003

PROPOSAL TO NASA FOR
**INTERNATIONAL SPACE
STATION UNITED STATES
DEORBIT VEHICLE**
ATTACHMENT J-30: WORK PLANS

MAY 14, 2024

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SR. PROGRAM DEVELOPMENT MANAGER

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1 PART A

Table A.2: CLIN 1 Core (Firm Fixed Price) Work Plan

Payment Number	Milestone (CLIN 1 Firm Fixed Price)	Contractual Due Date (Assignment +/- Months)	Contractual Due Date (Calendar Date)	Accomplishment Criteria	Payment Percentage for Milestone	Payment Percentage for Milestone (cumulative CLIN 1 value)	Payment Amount
C1-1	MILESTONE C1-1 MISSION CONCEPT REVIEW (MCR)	CLIN 1 ATP + 3.5 months	10/07/2024	As defined in SOW 3.6 and defined in the MCR Joint Implementation Plan (JIP).	(b) (4)		
C1-2	MILESTONE C1-2 SYSTEMS REQUIREMENTS REVIEW (SRR)	CLIN 1 ATP + 6.5 months	01/06/2025	As defined in SOW 3.7 and defined in the SRR Joint Implementation Plan (JIP).			
C1-3	MILESTONE C1-3 SYSTEM DEFINITION REVIEW (SDR)	CLIN 1 ATP + 10 months	04/25/2025	As defined in SOW 3.8 and defined in the SDR Joint Implementation Plan (JIP)			
C1-4	MILESTONE C1-4 PRELIMINARY DESIGN REVIEW (PDR)	CLIN 1 ATP + 12.4 months	07/02/2025	As defined in SOW 3.9 and defined in the PDR Joint Implementation Plan (JIP).			
C1-4B	MILESTONE C1-4B (PROPULSION SYSTEM DESIGN INTEGRATION REVIEW (PSDIR)	CLIN 1 ATP + 20.7 months	03/19/2026	As defined in Section 4.4 MA.3 in the Volume II Mission Suitability Factor			
C1-5	MILESTONE C1-5 CRITICAL DESIGN REVIEW (CDR)	CLIN 1 ATP + 25.5 months	07/29/2026	As defined in SOW 3.10 and defined in the CDR Joint Implementation Plan (JIP).			

2 PART B

Table B.2: CLIN 2 Core (Firm Fixed Price) Work Plan

Payment Number	Milestone (CLIN 2 Firm Fixed Price)	Contractual Due Date (Assignment +/- Months)	Contractual Due Date (Calendar Date)	Accomplishment Criteria	Payment Percentage for Milestone	Payment Percentage for Milestone (cumulative CLIN 2 value)	Payment Amount
C2-1	MILESTONE C2-1 LONG-LEAD PARTS	CLIN 2 ATP + 0.5 months	TBD filled in by CO at CLIN 2 ATP	<p>The Contractor shall place orders for Long-Lead Parts for flight hardware and flight hardware ground support equipment.</p> <p>The Contractor shall submit contractual agreements/ purchase orders evidencing procurement of the long-lead parts and planned on-dock delivery dates.</p>	(b) (4)		



Payment Number	Milestone (CLIN 2 Firm Fixed Price)	Contractual Due Date (Assignment +/- Months)	Contractual Due Date (Calendar Date)	Accomplishment Criteria	Payment Percentage for Milestone	Payment Percentage for Milestone (cumulative CLIN 2 value)	Payment Amount
C2-2	MILESTONE C2-2 SYSTEM INTEGRATION*	Milestone C2-4 SAR minus 15 months	TBD filled in by CO at CLIN 2 ATP	As defined in SOW 4.2 and defined in the SIR Joint Implementation Plan (JIP).	(b) (4)		
C2-3	MILESTONE C2-3 AI&T PROGRESS	Milestone C2-4 SAR minus 12 months	TBD filled in by CO at CLIN 2 ATP	As defined in SOW 4.3 and defined in the APR Joint Implementation Plan (JIP)	(b) (4)		
C2-4	MILESTONE C2-4 SYSTEM ACCEPTANCE	CLIN 2 ATP plus 37 months	TBD filled in by CO at CLIN 2 ATP	As defined in SOW 4.4 and defined in the SAR Joint Implementation Plan (JIP)	(b) (4)		
C2-5	MILESTONE C2-5 SHIPMENT TO ACCEPTANCE DESTINATION	Defined in Clause F.3 FAR 52.211-8 TIME OF DELIVERY	TBD filled in by CO at CLIN 2 ATP with Offeror proposed delivery date in Clause F.3 FAR 52.211-8 TIME OF DELIVERY**	As defined in SOW 4.5 and defined in the PSR JIP	(b) (4)		

* Cannot occur prior to successful completion of CLIN1 SOW 3.10, Critical Design Review (CDR).

** Cannot be later than Offeror Proposed Date in Section F, Clause F.3 FAR 52.211-8 TIME OF DELIVERY.

*** Payment Amounts for CLIN 2 CORE interim milestones are valid for up to one year beyond the proposed CLIN 2 CORE ATP date.

PART II – CONTRACT CLAUSES

ATTACHMENT J-31 GOVERNMENT TASK AGREEMENTS

(as proposed by Offeror and approved by NASA)

PART II – CONTRACT CLAUSES

ATTACHMENT J-32 STANDARD LABOR CATEGORIES

(as proposed by Offeror)

PART II – CONTRACT CLAUSES

**ATTACHMENT J-33 GOVERNMENT-FURNISHED
PROPERTY, FACILITIES AND DATA/INFORMATION**

(as proposed by Offeror)

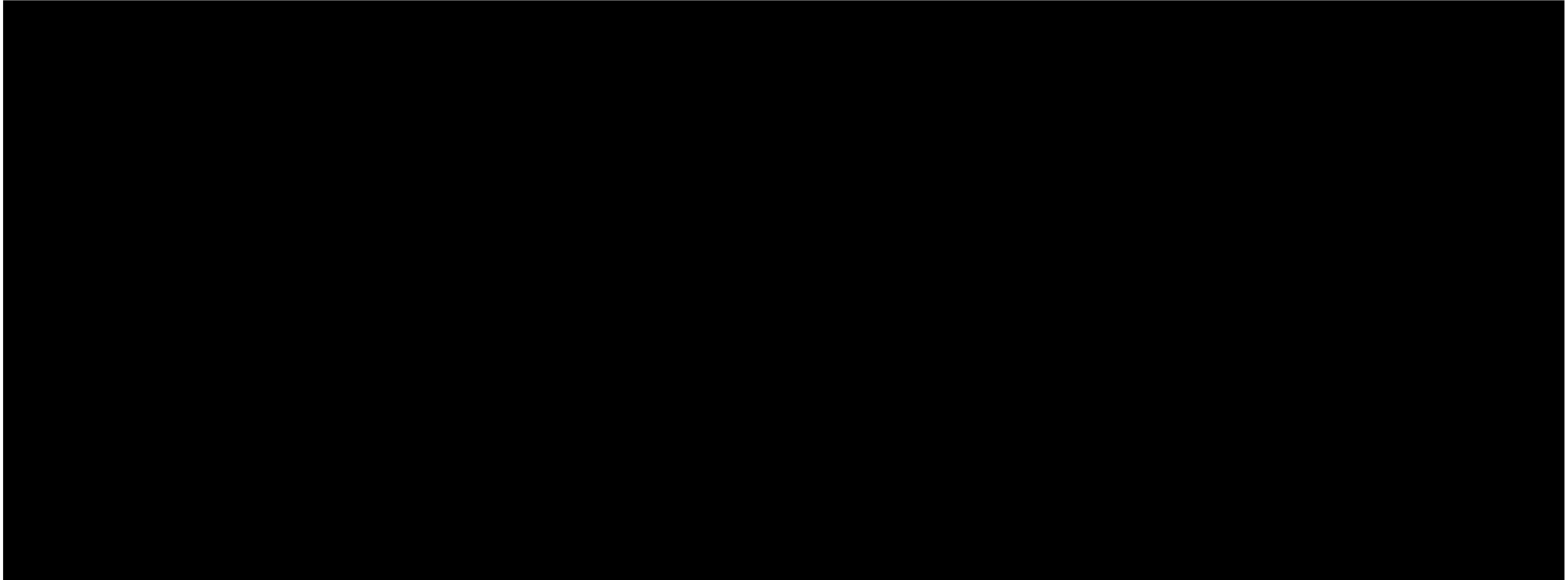
80JSC024CA002, Base Award
PART II – CONTRACT CLAUSES

GOVERNMENT-FURNISHED EQUIPMENT, MATERIALS, DATA, SOFTWARE, SERVICES AND FACILITIES

The Government-Furnished Property, Services and Facilities request the USDV Contractor for use in the performance of this Contract.

The Government does not intend to provide NASA IT assets (e.g., laptops/desktops, mobile devices, printers) during contract performance.

80JSC024CA002, Base Award **PART**
II – CONTRACT CLAUSES



80JSC024CA002, Base Award PART
II – CONTRACT CLAUSES

TABLE J-33-4 GOVERNMENT LAUNCH SITE AND IN-SPACE RESOURCES REQUESTED

Item No.	Resource	Quantity	Duration of Request	Applicable CLIN(s)	Rationale	Notes
1	(b) (4)	N/A	N/A	N/A	N/A	N/A

80JSC024CA002, Base Award PART
II – CONTRACT CLAUSES

TABLE J-33-5 GOVERNMENT DATA OR INFORMATION REQUESTED

Item No.	Description or Nomenclature	Need Date	Applicable CLIN(s) or Task Order	Rationale	Notes
1	(b) (4)	N/A	N/A	N/A	N/A

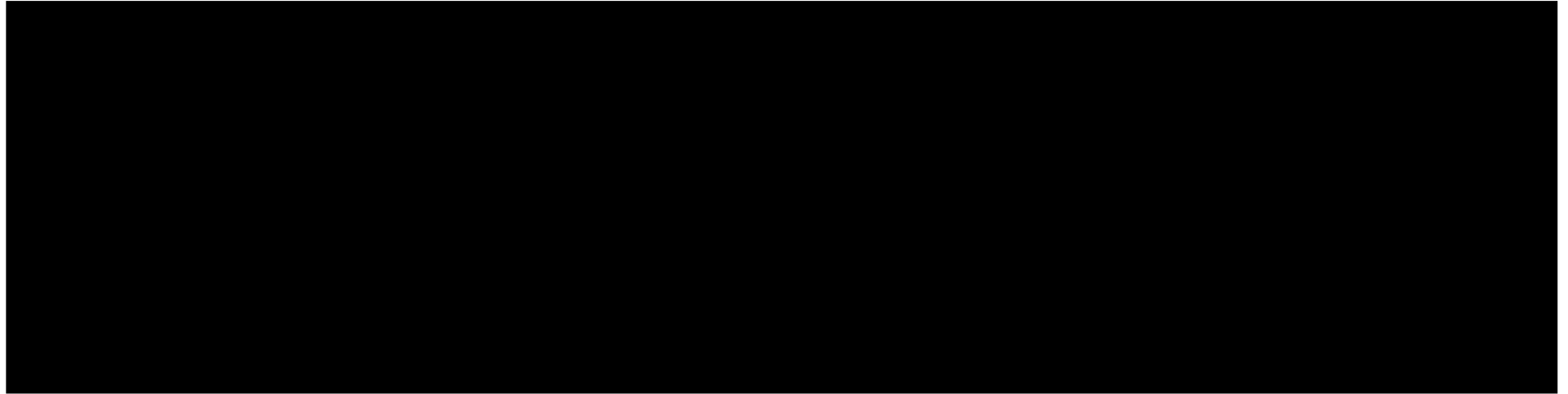
PART II – CONTRACT CLAUSES

**ATTACHMENT J-34 INSTALLATION ACCOUNTABLE
GOVERNMENT PROPERTY**

(as proposed by Offeror)

80JSC024CA002, Base Award **PART**
II – CONTRACT CLAUSES

Table J-34-1 Installation-Accountable Government Property (IAGP)



PART II – CONTRACT CLAUSES

ATTACHMENT J-35 RESERVED

PART II – CONTRACT CLAUSES

**ATTACHMENT J-36 AUTHORIZED LIMITED RIGHTS IN
DATA AND RESTRICTED COMPUTER SOFTWARE**

PART II – CONTRACT CLAUSES

Pursuant to FAR 52.227-14, Rights in Data, this attachment lists approved data not first produced in performance of this contract.

Appendix 1: Limited Rights Technical Data

In accordance with Federal Acquisition Regulation 52.227-14 and other terms of this contract the following items have been identified as limited rights data.

Technical Data to be Furnished with Restrictions*	Basis for Assertion**	Asserted Rights Category***	Name of Person Asserting Restrictions****	NASA Deliverable Item	SOW Deliverable Item
TBD	TBD	TBD	TBD	TBD	TBD

* If the assertion is applicable to items, components, or processes developed at private expense, identify both the data and each such item, component, or process.

**Generally, the development of an item, component, or process at private expense, either exclusively or partially, is the only basis for asserting restrictions on the Government's rights to use, release, or disclose technical data pertaining to such items, components, or processes. Indicate whether development was exclusively or partially at private expense. If development was not at private expense, enter the specific reason for asserting that the Government's rights should be restricted.

***Enter asserted rights category (e.g., government purpose license rights from a prior contract, rights in SBIR data generated under another contract, limited or government purpose rights under this or a prior contract, or specifically negotiated licenses).

****Corporation, individual, or other person, as appropriate.

Note 1:

This data embodies information that was created with private funds and is considered confidential or privileged information in accordance with the Data Rights Clause, The Freedom of Information Act, and the Trade Secrets Act.

Note 2:

This data embodies information that was created with private funds and is considered confidential or privileged information in accordance with the Data Rights Clause, The Freedom of Information Act, and the Trade Secrets Act. The following list of data items are the only data items used, furnished, or developed under this Contract that will be provided to the Government, though, with limited rights in accordance with FAR 52.227-14, Alternate II.

Appendix 2: Restricted Computer Software

PART II – CONTRACT CLAUSES

In accordance with Federal Acquisition Regulation 52.227-14 and other terms of this contract the following items have been identified as restricted computer software.

Technical Data to be Furnished with Restrictions*	Basis for Assertion**	Asserted Rights Category ***	Name of Person Asserting Restrictions ****	NASA Deliverable Item	SOW Deliverable Item
TBD	TBD	TBD	TBD	TBD	TBD

* If the assertion is applicable to items, components, or processes developed at private expense, identify both the data and each such item, component, or process.

**Generally, the development of an item, component, or process at private expense, either exclusively or partially, is the only basis for asserting restrictions on the Government's rights to use, release, or disclose technical data pertaining to such items, components, or processes. Indicate whether development was exclusively or partially at private expense. If development was not at private expense, enter the specific reason for asserting that the Government's rights should be restricted.

***Enter asserted rights category (e.g., government purpose license rights from a prior contract, rights in SBIR data generated under another contract, limited or government purpose rights under this or a prior contract, or specifically negotiated licenses).

****Corporation, individual, or other person, as appropriate.

Note 1:

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PART II – CONTRACT CLAUSES

ATTACHMENT J-37 RESERVED

PART II – CONTRACT CLAUSES

**ATTACHMENT J-38 DD FORM 254, DEPARTEMENT OF
DEFENSE CONTRACT SECURITY CLASSIFICATEION
SPECIFICATION**

PART II – CONTRACT CLAUSES

**ATTACHMENT J-39 PROPULSION SYSTEM
DEVELOPMENT APPROACH**

(as proposed by Offeror)



80JSC023R0003

PROPOSAL TO NASA FOR

INTERNATIONAL SPACE STATION UNITED STATES DEORBIT VEHICLE

ATTACHMENT J-39: PROPULSION SYSTEM DEVELOPMENT APPROACH

MARCH 4, 2024

(b) (4)

SR. PROGRAM DEVELOPMENT MANAGER

(b) (4), (b) (6)

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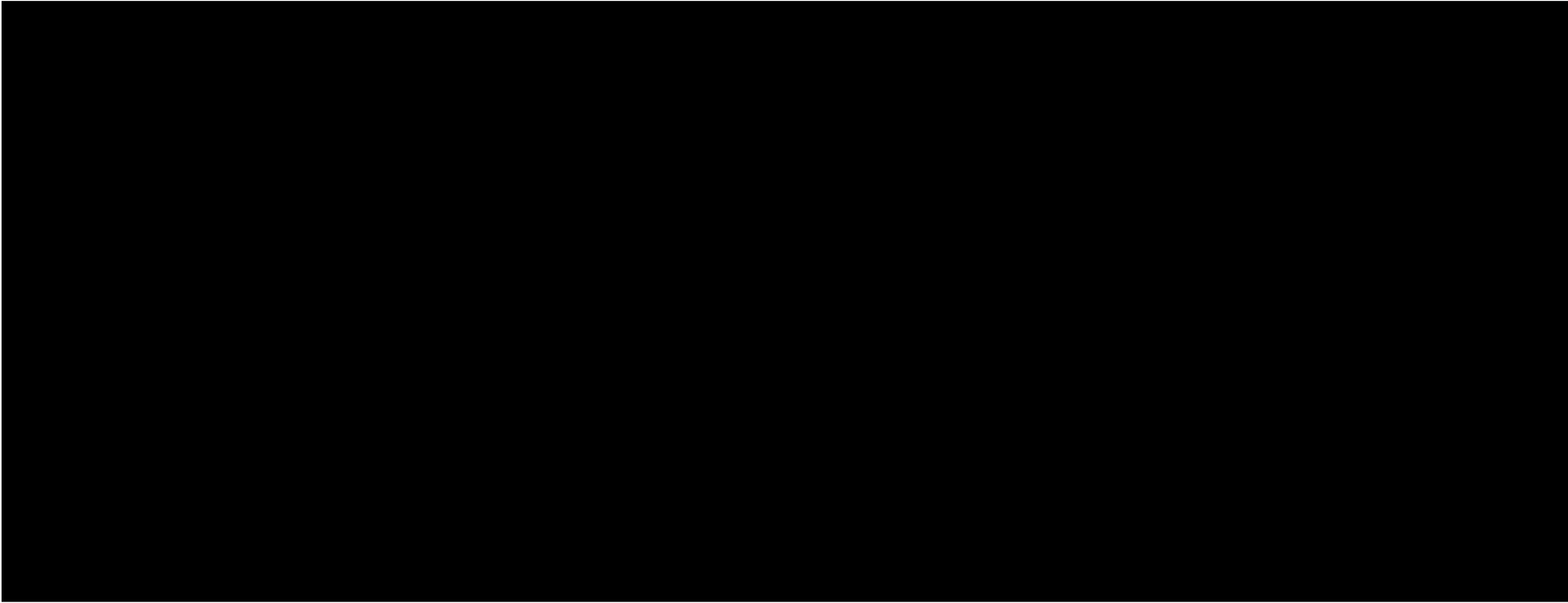
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PART IV - REPRESENTATIONS AND INSTRUCTIONS

ATTACHMENT J-40 DELIVERABLE ITEM LIST

(End of Section)





US Deorbit Vehicle

Contract Kickoff

Date: July 30, 2024

Presenters: BG/A. Chaves
OAM. Boggs

WE PROVIDE THE RIDE



Post Award Conference



WE PROVIDE THE RIDE





Purpose of the Post Award Conference Report

- In accordance with Federal Acquisition Regulation (FAR) 42.501 and NASA FAR Supplement (NFS) 1842.503 a post-award orientation aids both the Government and Contractor personnel to:
 1. Achieve a clear and mutual understanding of all contract requirements
 2. Identify and resolve potential problems
 3. Manage complex risk management areas
 4. Finalize the Government and contractor teams preparations for execution
 5. Provide necessary working-level information to facilitate effective and efficient performance



Post Award Conference Procedures

- In accordance with (FAR) 42.503-2 the purpose of the meeting is not to change the contract:
 1. The Contracting Officer may make commitments or give directions within the scope of the Contracting Officer's authority and shall put in writing and sign any commitment or direction, whether or not it changes the contract
 2. Any change to the contract that results from the post-award conference shall be made only by a contract modification referencing the applicable terms and conditions of the contract.
- The USDV contract is the controlling document, not the content of these slides.



Functions & Authority of Government Personnel

- Contracting Officer (CO)(FAR 1.602):
 - Ensure performance of all necessary actions for effective contracting, ensuring compliance with the terms of the contract and safeguarding the interest of the United States in contractual relationships.
 - Ensure that Contractors receive impartial, fair, and equitable treatment.
 - Are the only individuals with the authority to enter into, administer, or terminate contracts and make related determinations and findings.
 - May bind the Government only to the extent of the authority delegated to them, as specified in their CO's warrant.
 - Shall not enter into a contract unless all requirements of law, executive orders, regulations, and all other applicable procedures, including clearances and approvals, have been met.



Functions & Authority of Government Personnel

- Contracting Officer Representative (COR) (FAR 1.604):
 - Monitors Contractor performance and reports to CO
 - Establishes and maintains an audit, surveillance, and insight plan
 - Certifies acceptance or non-acceptance of work (mission success criteria)
 - Approves and issues technical direction, as required
 - Ensures Contractor compliance with the defined SOW or specifications in the contract
 - Recommends to CO any desired changes in scope or technical provisions of the contract with justification
 - POC for Personal Identity Verification (PIV) of Contractor Personnel
 - Authorizes access to NASA computer resources and approves personnel to acquire an NDC account (pre-requisite for NASA IT access)

Functions & Authority of Government Personnel



- **Making Changes to the Contract (FAR 43.102)**
 - Only COs acting within the scope of their authority are empowered to execute contract modifications on behalf of the Government. Other Government personnel cannot:
 - execute contract modifications,
 - act in such a manner as to cause the Contractor to believe they have authority to bind the Government; or
 - direct or encourage the Contractor to perform work that should be the subject of a contract modification.
 - Contract modifications, including changes that could be issued unilaterally, should be priced before their execution if this can be done without adversely affecting the interest of the Government.
 - Unilateral modification: signed only by the contracting officer. Examples include: administrative changes; issuance of task orders; changes authorized by clauses other than a changes clause; and issuance of termination notices.
 - Bilateral modification: signed by the contractor and the contracting officer. Used to: make negotiated equitable adjustments resulting from the issuance of a change order; definitize letter contracts; and reflect other agreements of the parties modifying the terms of contracts.
 - Should any issue arise that could have a potential price and/or schedule impact, alert the CO and COR immediately and act in compliance with FAR 52.243-7, Notification of Changes.



Functions & Authority of Government Personnel

- **Technical Direction (SOW 1.4)**

- *Technical direction* means a directive to the Contractor that approves approaches, solutions, designs, or refinements; fills in details or otherwise completes the general description of work or documentation items; shifts emphasis among work areas or tasks; or furnishes similar instruction to the Contractor.
- *Technical direction* includes requiring studies and pursuit of certain lines of inquiry regarding matters within the general tasks and requirements in the contract Statement of Work.
- The COR does not have the authority to, and shall not, issue any instruction purporting to be technical direction that composes of the following:
 1. Constitutes an assignment of additional work outside the Statement of Work.
 2. Constitutes a change as defined in the “Changes” clause (contract Section I).
 3. Constitutes a basis for any increase or decrease in the total estimated contract cost, the fixed fee (if any), or the time required for contract performance.
 4. Changes any of the expressed terms, conditions, or specifications of the contract.
 5. Interferes with the Contractor’s rights to perform the terms and conditions of the contract.
- All technical direction shall be issued in writing by the COR.

Contract Overview



- **Type of Contract:**

- Firm Fixed Price Core with Indefinite Delivery Indefinite Quantity (IDIQ) Firm Fixed Price (FFP) task orders

- **Period of Performance:**

- Base period: 06/26/2024 – 03/31/2031

- Option Year 1: 04/01/2031 – 9/30/2031
- Option Year 2: 10/01/2031 – 9/30/2032
- Option Year 3: 10/01/2032 – 9/30/2033
- Option Year 4: 10/01/2033 – 9/30/2034
- Option Year 5: 10/01/2034 – 9/30/2035

- In accordance with Clause I.7 FAR 52.216-22 Indefinite Quantity, all IDIQ deliveries for supplies or services must be completed within 24 months after the end of the ordering period identified in Clause I.5 FAR 52.216-18 Ordering

- **CLIN Structure:**

- CLIN 1 DDT&E THROUGH CDR (CORE)
- CLIN 2 PRODUCTION, ASSEMBLY, INTEGRATION AND TEST (CORE)
- CLIN 3 DWELL (IDIQ)
- CLIN 4 LAUNCH VEHICLE (LV) INTEGRATION AND SUSTAINING (IDIQ)
- CLIN 5 SPECIAL TASKS AND STUDIES (IDIQ) (FFP)
 - Sub-CLIN 5A Special Studies (IDIQ) (FFP)
 - Sub-CLIN 5B Evaluation Requirements (IDIQ) (FFP)

Terms and Conditions



- **F.3 FAR 52.211-8 TIME OF DELIVERY**

- Completion of both Milestone C.2-4 System Acceptance and Milestone C.2-5 Shipment to Acceptance Destination
 - Contractual Due Date: August 1, 2028

- **G.2 NFS 1852.232-80 SUBMISSION OF VOUCHERS FOR PAYMENT**

- Contractor shall submit all vouchers and invoices using the steps described at NSSC's Vendor Payment information web site at: <https://www.nssc.nasa.gov/vendorpayment>.
- NSSC Customer Contact Center at 1-877-NSSC123 (1-877-677-2123)
- Payments will be made in accordance with Clause H.13 Payments, Events, and Accomplishment Criteria, I.14 Performance Based Payments, Attachment J-30, Work Plans, or payment scheduled established in each Task Order

- **G.5 NFS 1852.245-76 LIST OF GOVERNMENT PROPERTY FURNISHED PURSUANT TO FAR 52.245-1**

- Discussion of Contractor Need Dates and Delivery Location

- (b) (4) [REDACTED]
- (b) (4) [REDACTED]

- Government Property POC

- (b) (6) [REDACTED], JSC Industrial Property Officer
- (b) (6) [REDACTED]
- (b) (6) [REDACTED]

Terms and Conditions

- E.2 FAR 52.246-11, Higher-Level Contract Quality Requirements
 - SAE Aerospace Quality Management System, AS9100
 - Quality Management System – Requirements for Aviation, Space and Defense Organizations – Deliverable Software, AS9115
- E.3 NFS 1852.246-71 Government Contract Quality Assurance Functions

Item	Quality Assurance Function	Location
1	Perform surveillance, Product Assurance Action, Audits, Government mandatory inspections, process assessments, acceptance, procurement quality assurance and source inspections. Review and assessment of discrepancy reports, nonconformances, waivers, test preparation sheets, procedures, hazard reports, Failure Modes and Effects Analysis (FMEA).	JSC, KSC, Contractor's Facility(s), Subcontractor and Vendors' Facilities



Terms and Conditions

- **H.1 1852.235-73 FINAL SCIENTIFIC AND TECHNICAL REPORTS**
 - Contractor shall submit to the CO a final report that summarizes the results of the entire contract, including recommendations and conclusions based on the experience and results obtained
- **H.7 NFS 1852.235-74 ADDITIONAL REPORTS OF WORK - RESEARCH AND DEVELOPMENT**
 - Contractor shall submit to the CO monthly and quarterly reports
 - Monthly reports that provides quantitative description of progress, an indication of any current problems that may impede performance, proposed corrective action, and a discussion of the work to be performed during the next monthly reporting period
 - Quarterly reports are covered by the quarterly Program Management Review (DRD USDV-2)
- **H.9 NASA INSIGHT AND APPROVAL**
 - Describes the intended primary working-level interface between the Contractor and the Government during execution of this contract
- **H.10 ASSOCIATE CONTRACTOR AGREEMENTS**
 - Contractor shall enter into Associate Contractor Agreements (ACAs) with the contractors of the contracts outlined in the clause
 - A copy of each agreement shall be provided to the CO



Terms and Conditions

- **H.15 MITIGATION OF ORGANIZATIONAL CONFLICTS OF INTEREST**
 - Attachment J-10, Organizational Conflicts of Interest (OCI) Plan will be incorporated into the contract
- **H.16 DISCLOSURE OF ORGANIZATIONAL CONFLICTS OF INTEREST AFTER CONTRACT AWARD**
 - Organizational conflict of interest that has not already been adequately disclosed and resolved, the Contractor shall make a prompt and full disclosure in writing to the Contracting Officer
- **H.21 SPECIAL TOOLING, SPECIAL TEST EQUIPMENT, AND MANUFACTURING AIDS FOR USDV**
 - Contractor shall notify NASA 60 calendar days prior to final disposition of special tooling, special test equipment, and manufacturing aids unique to the USDV.
- **H.25 USE OF GOVERNMENT RESOURCES**
 - Contractor is responsible for the cost of any such new or modified Government Task Agreement (GTA) pursuant to FAR 52.243-1 – Changes – Fixed-Price (ALT V)



Terms and Conditions

- H.28 USDV COMMUNICATIONS

- Contractor shall coordinate

- All responses to media inquiries and public communications efforts with NASA Communications related to its efforts on the USDV prior to release
- At least seven (7) days prior to any media or public communications products (releases, advisories, and web articles), media interviews, news conferences, contingency statements, media scouts, photo opportunities and film activities regarding its USDV efforts
- At least three (3) days prior to its release, the use of any direct quote by a NASA official shall be submitted to NASA Communications for concurrence to ensure accuracy and appropriateness
- Knowledge of a press is inquiring about an event that meets criteria set forth in NFS 1852.223-70 SAFETY AND HEALTH MEASURES AND MISHAP REPORTING by notifying the CO, or designee

- Coordinate with NASA CO and Public Affairs Office (PAO)

- NASA PAO POC: Sandra Jones, sandra.p.jones@nasa.gov, (b) (6)



Terms and Conditions

- I.1 FAR 52.211-15, DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS
 - USDV is currently a DO-C9 rating
 - NASA is working to obtain a DX rating for USDV
 - NASA will need assistance with the following information:
 - Critical components
 - Material shortages
 - Current actions being taken to meet program schedules
 - Major or Single Source producers
 - Contractors' ability to surge production
- I.8 FAR 52.217-7 OPTION FOR INCREASED QUANTITY - SEPARATELY PRICED LINE ITEM (CLIN 2A CRITICAL SPARES)
 - CO may exercise the option by written notice to the Contractor within 2 years of contract award
- I.21 NFS 1852.204-75 SECURITY CLASSIFICATION REQUIREMENTS
 - Attachment J-38, *DD Form 254, Department of Defense Contract Security Classification Specification* will be updated post award



Terms and Conditions

- **H.6 NFS 1852.235-71 Key Personnel and Facilities**

- In accordance with NFS 1852.235-77, before removing, replacing, or diverting any of the personnel or facilities listed in the clause, the Contractor shall notify the Contracting Officer reasonably in advance

- Submit a justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on this contract.

- A bi-lateral modification will be issued to reflect updates to key personnel and facilities

- **H.13 Payments, Events and Accomplishment Criteria**

- The CO will unilaterally determine the Contractor's accomplishment and successful completion of each milestone in accordance with each Program Event



Terms and Conditions

- Data Rights

- K.21 52.227-15 REPRESENTATION OF LIMITED RIGHTS DATA AND RESTRICTED COMPUTER SOFTWARE

- Any identification of Limited Rights Data or Restricted Computer Software in the offeror's response is not determinative of the status of the data should a contract be awarded to the offeror
- Contractor is required to substantiate Limited Rights Data and Restricted Computer Software assertions with evidence through recorded information, the stages of development, and the source of funds at the lowest segregable level, that the technical data / software was developed wholly at private expense.

- H.17 IDENTIFICATION AND REPRESENTATION OF LIMITED RIGHTS DATA AND RESTRICTED COMPUTER SOFTWARE AFTER AWARD

- Attachment J-36, *Authorized Limited Rights in Data and Restricted Computer Software* outlines Limited Rights Data and Restricted Computer Software to be delivered in performance of this contract
- Contractor shall not deliver any data in performance of this contract with restrictive or limiting markings unless the data are listed in Attachment J-36, *Authorized Limited Rights in Data and Restricted Computer Software*
- Additional identification and representations may be made after award by submitting a request with substantiation to the CO



Terms and Conditions

- Data Rights (Cont.)

- I.16 FAR 52.227-14 RIGHTS IN DATA—GENERAL (MAY 2014) ALTERNATE II (DEC 2007) [(MODIFIED BY NFS 1852.227-14 (APR 2015))] ALTERNATE III (DEC 2007) ALTERNATE V (DEC 2007)

- The Government shall receive:

- Unlimited rights in data for (1) data first produced in performance of the contract; (2) form, fit, and function data delivered under the contract; (3) manuals or instructional and training materials for installation, operations or routine maintenance and repair of items, components or processes delivered or furnished under the contract; (4) all other data delivered under the contract not otherwise marked as Limited Rights Data or Restricted Computer Software
- Limited rights in data developed wholly at private expense; must be substantiated by contractor through financial and technical records and authorized by CO as documented in Attachment J-36, *Authorized Limited Rights in Data and Restricted Computer Software*

- Data delivered in performance of the contract shall contain the appropriate language outlined in the following notices:

- Government Rights Notice, Limited Rights Notice, and Restricted Rights Notice

- H.11 DATA CONTAINING AN INCORRECT NOTICE

- The Contractor shall be responsible for substantiating an incorrect notice at its own expense
- If the CO notifies the Contractor of an incorrect notice and the Contractor fails to remove or correct the marking within 60 days after receipt of such notice, the Government shall have the right to cancel or ignore the markings after said period and the data will no longer be made subject to any disclosure prohibitions

- H.12 INCORRECT NOTICE AND REQUIREMENTS FOR WRITTEN JUSTIFICATION OF RESTRICTED MARKINGS

- Incorrect notice means a marking placed on data or computer software delivered or otherwise furnished to the Government under this contract that is not in a format authorized by this contract

Data Markings



- Data delivered to NASA shall follow the Government-wide Controlled Unclassified Information (CUI) program standards
- Data delivered to NASA shall identify any NASA CO approved limited and/or restricted rights data per Attachment J-36 at the lowest segregable level. Other data within the deliverable that is not limited or restricted rights should not be globally marked as such.
- Data delivered with Export Control markings
 - SOW 2.5 Export Control The Contractor shall ensure that only specific data that has been identified as Export Administrative Regulations (EAR) and international Traffic in Arms Regulations (ITAR) designations is marked with an appropriate Destination Control Statement that includes the export classification and corresponding export authority. Other data within deliverable that is not export controlled should not be globally marked as EAR or ITAR
 - Attachment J-01 lists the expected EAR and ITAR markings. Be sure to included the Destination Control Statement that included export classification and corresponding export authority



Attachment J-30: Work Plans

- Work Plans include the contractual due dates by which the Contractor demonstrate successful completion of each milestone.
- CLIN 1 Work Plan effective at contract award
 - Includes the contractual due dates for CLIN 1 milestone completion dates.
- CLIN 2 Work Plan as proposed included in Attachment J-30, Work Plans
 - NASA requested to ATP NLT ^{(b) (4)} [REDACTED] per SpaceX proposal
- CLIN2A Option (if exercised) as proposed included in Clause I.8
 - NASA to exercise option, if required, NLT 2 years post contract award



CLIN5B Tasking

- CLIN 5B Tasking Approach
 - NASA identifies the list of tasks quarterly to be performed
 - NASA and SpaceX bilaterally agree on the Tier level for the quarter to accomplish the tasks
 - CLIN5B Task Order revised with the agreed to tier level for the quarter
 - At end of quarter, NASA and SpaceX bilaterally agree on task completion status

Unique Aspects



- USDV Acceptance
 - E.1 FAR 52.246-15 Certificate of Conformance
 - Contractor provides Certificate of Conformance with DD-250
 - E.5 Preliminary Inspection at Source and Final Inspection and Acceptance at Destination
 - Preliminary inspection for compliance with the contract specifications and requirements may be performed at origin
 - Final inspection occurs at Acceptance Destination
 - DRD USDV-36 USDV Acceptance Data
 - Contractor provides the objective evidence needed by NASA to establish the acceptability of integrated systems/hardware/software for its intended use in compliance with contract requirements
 - E.1 FAR 52.227-16 Additional Data Requirements
 - Enables CO to order additional data first produced or specifically used in the performance of the contract within 3 years after acceptance of all deliverable items
 - E.1 FAR 52.246-16 Responsibility for Supplies
 - NASA accepting title of all supplies delivered on this contract, including the USDV
- Indemnification for Unusually Hazardous Risks
 - NASA is working on the Indemnification requested
 - NASA Administrator is the approval authority



Unique Aspects

- Delegations:
 - COR
 - Property Administration and Plant Clearance
 - Quality Assurance



Upcoming DRD deliverables

- USDV-1 Program Management Plan (update at 30 working days after award)
- USDV-2 Program Management Review (data delivered last Thursday of month following quarter)
- USDV-3 Project Lifecycle Review Plan - MCR JIP due at Contract Kickoff
- USDV-6 WBS and WBS Dictionary (update at 30 calendar days after award)
- USDV-7 IMPDAR (monthly, NLT 6 Gov't workdays after contractor's month end)
- USDV-10 OCI Plan (final at 30 days after award)
- USDV-12 DEIA Plan (final at 30 working days after award)
- USDV-14 IT Security Management Plan (initial at 30 calendar days after award)
 - IT Security Plan (due 30 calendar days after requested by Gov't)
- USDV-15 Export Control Plan (final at 30 calendar days after award)
- USDV-16 Gov't Property Mgmt Plan (final at 30 calendar days after award)
 - Detailed Supplemental Gov't Prop Mgmt procedures (due 60 calendar days after award)
- USDV-18 Safety & Health Plan (initial at 30 calendar days after award) – Approved SpaceX request to extend to 45 calendar days after award.
- USDV-20 S&MA Plan (Vol 2) (initial at 30 calendar days after award) – Approved SpaceX request to extend to 45 calendar days after award.
- USDV-22 Mishap Preparedness and Contingency Plan (initial at 30 calendar days after award)
- USDV-27 Systems Eng Mgmt Plan (initial at 30 calendar days after award) – Approved SpaceX request to extend to 45 calendar days after award.



- **NASA Points of Contact for Information Security**
 - ISS Program Office Chief Information Security Officer (CISO) – (b) (6)
 - JSC Chief Information Security Officer (CISO) – (b) (6)
- **Information Security Incident Notification – NASA Security Operations Center (SOC)**
 - Email soc@nasa.gov (24x7)
 - 1-877-627-2732 (24x7)
- **Any Contractor information security related incidents involving NASA data, interfaces, or devices must be reported to the SOC as soon as possible.**
- **Reviews Information Technology Security Management Plan (ITSMP) and IT Security Plan**
 - Describes how the company safeguards any NASA information stored/processed by the company in support of the execution of the contract
- **The JSC Procurement Work Instruction related to JSC Security:**
 - 52.204-92 NASA Security Program and Identification of Employees. (Jul 2022) (JSC Procurement Instruction)



NASA IT and Physical Access

- Plan to use existing processes to onboard SpaceX employees for access to IT and Physical Access
- JF200 Card for USDV Contract currently on-file with JSC Security.
- SpaceX FSO to add an affiliation to any SpaceX employee working USDV to the USDV agreement in NAMS.
- SpaceX FSO to submit all NAMS requests for SpaceX-USDV personnel to COR for sponsoring.
- All SpaceX employees requiring NASA IT access must complete NASA IT security training every 365 days. If training lapses, the employee will be locked out of NASA IT systems.

Government Furnished Property Requests



- Requests for additional GFP may be considered by NASA but will require consideration pursuant to FAR 45.301 (d). Contract clause 52.245-9, Use and Charges, may apply.
- Include the following in all requests:
 - Reasons why contractor-owned property cannot be used.
 - Part number
 - Description of property
 - Flight Hardware (Y/N)
 - Quantity requested
 - Contract # and POC of contract to which the property is currently accountable (if applicable)
 - Need date (adequate notice required for consideration of request)
 - One of the following statements:
 - The property will be consumed in performance of services to the Government, or
 - The requested equipment will be returned in the same condition as existed prior to its loan and any costs associated with maintenance, recalibration, and/or repair to property used during the loan period shall be born by the contractor.



BACKUP

Key POC List



Name	Role	Email
Dana Weigel	OA/ISS Program Manager	(b) (6)
(b) (6)	ON1/ISS Transportation Integration Office Manager	
	ON5/Deorbit Vehicle Management Office Branch Manager	
	ON5/Deorbit Vehicle Project Manager	
	ON5/Mission and Integration Manager	
	ON1/USDV Business Manager	
	ON5/Safety and Reliability Lead	
	OA/Contracting Officer Representative	
	BG/Contracting Officer	
	OE/USDV Safety Lead	
	OD/Avionics and Software Lead	
	CA/FOD Lead Flight Director	
	EX/USDV Chief Engineer	

Limited and Restricted Rights Notices for USDV Contract



Limited Rights Notice (DEC 2007)

(a) These data are submitted with limited rights under Government Contract No. 80JSC024CA002. These data may be reproduced and used by the Government with the express limitation that they will not, without written permission of the Contractor, be used for purposes of manufacture nor disclosed outside the Government; except that the Government may disclose these data outside the Government to support service contractors and/or pursuant to agreements and contracts related to human exploration such as the ISS, Gateway, or Artemis programs for the following purposes, if any; provided that the Government makes such disclosure subject to prohibition against further use and disclosure:

- (i) Use (except for manufacture) by support service Contractors
- (ii) Evaluation by nongovernment evaluators.
- (iii) Use (except for manufacture) by other contractors participating in the Government's program of which the specific contract or agreement is a part.
- (iv) Emergency repair or overhaul work.
- (v) Release to a foreign government, contractors, or its instrumentalities, if required to serve the interests of the U.S. Government, for information or evaluation, or for emergency repair or overhaul work by the foreign government.

(b) This notice shall be marked on any reproduction of these data, in whole or in part.

Restricted Rights Notice (Dec 2007)

(a) This computer software is submitted with restricted rights under Government Contract No. 80JSC024CA002. It may not be used, reproduced, or disclosed by the Government except as provided in paragraph (b) of this notice or as otherwise expressly stated in the contract.

(b) This computer software may be-

- (1) Used or copied for use with the computer(s) for which it was acquired, including use at any Government installation to which the computer(s) may be transferred;
- (2) Used or copied for use with a backup computer if any computer for which it was acquired is inoperative;
- (3) Reproduced for safekeeping (archives) or backup purposes;
- (4) Modified, adapted, or combined with other computer software, provided that the modified, adapted, or combined portions of the derivative software incorporating any of the delivered, restricted computer software shall be subject to the same restricted rights;
- (5) Disclosed to and reproduced for use by support service Contractors or their subcontractors in accordance with paragraphs (b)(1) through (4) of this notice; and
- (6) Used or copied for use with a replacement computer.

(c) Notwithstanding the foregoing, if this computer software is copyrighted computer software, it is licensed to the Government with the minimum rights set forth in paragraph (b) of this notice.

(d) Any other rights or limitations regarding the use, duplication, or disclosure of this computer software are to be expressly stated in, or incorporated in, the contract.

(e) This notice shall be marked on any reproduction of this computer software, in whole or in part.



US Deorbit Vehicle

Contract Kickoff

Date: July 30, 2024

Presenters: BG/A. Chaves
OAM. Boggs

WE PROVIDE THE RIDE



Post Award Conference



WE PROVIDE THE RIDE





Purpose of the Post Award Conference Report

- In accordance with Federal Acquisition Regulation (FAR) 42.501 and NASA FAR Supplement (NFS) 1842.503 a post-award orientation aids both the Government and Contractor personnel to:
 1. Achieve a clear and mutual understanding of all contract requirements
 2. Identify and resolve potential problems
 3. Manage complex risk management areas
 4. Finalize the Government and contractor teams preparations for execution
 5. Provide necessary working-level information to facilitate effective and efficient performance



Post Award Conference Procedures

- In accordance with (FAR) 42.503-2 the purpose of the meeting is not to change the contract:
 1. The Contracting Officer may make commitments or give directions within the scope of the Contracting Officer's authority and shall put in writing and sign any commitment or direction, whether or not it changes the contract
 2. Any change to the contract that results from the post-award conference shall be made only by a contract modification referencing the applicable terms and conditions of the contract.
- The USDV contract is the controlling document, not the content of these slides.



Functions & Authority of Government Personnel

- Contracting Officer (CO)(FAR 1.602):
 - Ensure performance of all necessary actions for effective contracting, ensuring compliance with the terms of the contract and safeguarding the interest of the United States in contractual relationships.
 - Ensure that Contractors receive impartial, fair, and equitable treatment.
 - Are the only individuals with the authority to enter into, administer, or terminate contracts and make related determinations and findings.
 - May bind the Government only to the extent of the authority delegated to them, as specified in their CO's warrant.
 - Shall not enter into a contract unless all requirements of law, executive orders, regulations, and all other applicable procedures, including clearances and approvals, have been met.



Functions & Authority of Government Personnel

- Contracting Officer Representative (COR) (FAR 1.604):
 - Monitors Contractor performance and reports to CO
 - Establishes and maintains an audit, surveillance, and insight plan
 - Certifies acceptance or non-acceptance of work (mission success criteria)
 - Approves and issues technical direction, as required
 - Ensures Contractor compliance with the defined SOW or specifications in the contract
 - Recommends to CO any desired changes in scope or technical provisions of the contract with justification
 - POC for Personal Identity Verification (PIV) of Contractor Personnel
 - Authorizes access to NASA computer resources and approves personnel to acquire an NDC account (pre-requisite for NASA IT access)



Functions & Authority of Government Personnel

- **Making Changes to the Contract (FAR 43.102)**
 - Only COs acting within the scope of their authority are empowered to execute contract modifications on behalf of the Government. Other Government personnel cannot:
 - execute contract modifications,
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 - Unilateral modification: signed only by the contracting officer. Examples include: administrative changes; issuance of task orders; changes authorized by clauses other than a changes clause; and issuance of termination notices.
 - Bilateral modification: signed by the contractor and the contracting officer. Used to: make negotiated equitable adjustments resulting from the issuance of a change order; definitize letter contracts; and reflect other agreements of the parties modifying the terms of contracts.
 - Should any issue arise that could have a potential price and/or schedule impact, alert the CO and COR immediately and act in compliance with FAR 52.243-7, Notification of Changes.



Functions & Authority of Government Personnel

- **Technical Direction (SOW 1.4)**

- *Technical direction* means a directive to the Contractor that approves approaches, solutions, designs, or refinements; fills in details or otherwise completes the general description of work or documentation items; shifts emphasis among work areas or tasks; or furnishes similar instruction to the Contractor.
- *Technical direction* includes requiring studies and pursuit of certain lines of inquiry regarding matters within the general tasks and requirements in the contract Statement of Work.
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 3. Constitutes a basis for any increase or decrease in the total estimated contract cost, the fixed fee (if any), or the time required for contract performance.
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- Firm Fixed Price Core with Indefinite Delivery Indefinite Quantity (IDIQ) Firm Fixed Price (FFP) task orders

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Terms and Conditions



- **F.3 FAR 52.211-8 TIME OF DELIVERY**

- Completion of both Milestone C.2-4 System Acceptance and Milestone C.2-5 Shipment to Acceptance Destination
 - Contractual Due Date: August 1, 2028

- **G.2 NFS 1852.232-80 SUBMISSION OF VOUCHERS FOR PAYMENT**

- Contractor shall submit all vouchers and invoices using the steps described at NSSC's Vendor Payment information web site at: <https://www.nssc.nasa.gov/vendorpayment>.
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- Payments will be made in accordance with Clause H.13 Payments, Events, and Accomplishment Criteria, I.14 Performance Based Payments, Attachment J-30, Work Plans, or payment scheduled established in each Task Order

- **G.5 NFS 1852.245-76 LIST OF GOVERNMENT PROPERTY FURNISHED PURSUANT TO FAR 52.245-1**

- Discussion of Contractor Need Dates and Delivery Location

- (b) (4) [REDACTED]
- (b) (4) [REDACTED]

- Government Property POC

- (b) (6) [REDACTED], JSC Industrial Property Officer
- (b) (6) [REDACTED]
- (b) (6) [REDACTED]



Terms and Conditions

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Item	Quality Assurance Function	Location
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- **H.7 NFS 1852.235-74 ADDITIONAL REPORTS OF WORK - RESEARCH AND DEVELOPMENT**
 - Contractor shall submit to the CO monthly and quarterly reports
 - Monthly reports that provides quantitative description of progress, an indication of any current problems that may impede performance, proposed corrective action, and a discussion of the work to be performed during the next monthly reporting period
 - Quarterly reports are covered by the quarterly Program Management Review (DRD USDV-2)
- **H.9 NASA INSIGHT AND APPROVAL**
 - Describes the intended primary working-level interface between the Contractor and the Government during execution of this contract
- **H.10 ASSOCIATE CONTRACTOR AGREEMENTS**
 - Contractor shall enter into Associate Contractor Agreements (ACAs) with the contractors of the contracts outlined in the clause
 - A copy of each agreement shall be provided to the CO



Terms and Conditions

- **H.15 MITIGATION OF ORGANIZATIONAL CONFLICTS OF INTEREST**
 - Attachment J-10, Organizational Conflicts of Interest (OCI) Plan will be incorporated into the contract
- **H.16 DISCLOSURE OF ORGANIZATIONAL CONFLICTS OF INTEREST AFTER CONTRACT AWARD**
 - Organizational conflict of interest that has not already been adequately disclosed and resolved, the Contractor shall make a prompt and full disclosure in writing to the Contracting Officer
- **H.21 SPECIAL TOOLING, SPECIAL TEST EQUIPMENT, AND MANUFACTURING AIDS FOR USDV**
 - Contractor shall notify NASA 60 calendar days prior to final disposition of special tooling, special test equipment, and manufacturing aids unique to the USDV.
- **H.25 USE OF GOVERNMENT RESOURCES**
 - Contractor is responsible for the cost of any such new or modified Government Task Agreement (GTA) pursuant to FAR 52.243-1 – Changes – Fixed-Price (ALT V)



Terms and Conditions

- H.28 USDV COMMUNICATIONS

- Contractor shall coordinate

- All responses to media inquiries and public communications efforts with NASA Communications related to its efforts on the USDV prior to release
- At least seven (7) days prior to any media or public communications products (releases, advisories, and web articles), media interviews, news conferences, contingency statements, media scouts, photo opportunities and film activities regarding its USDV efforts
- At least three (3) days prior to its release, the use of any direct quote by a NASA official shall be submitted to NASA Communications for concurrence to ensure accuracy and appropriateness
- Knowledge of a press is inquiring about an event that meets criteria set forth in NFS 1852.223-70 SAFETY AND HEALTH MEASURES AND MISHAP REPORTING by notifying the CO, or designee

- Coordinate with NASA CO and Public Affairs Office (PAO)

- NASA PAO POC: Sandra Jones, sandra.p.jones@nasa.gov, (b) (6)



Terms and Conditions

- I.1 FAR 52.211-15, DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS
 - USDV is currently a DO-C9 rating
 - NASA is working to obtain a DX rating for USDV
 - NASA will need assistance with the following information:
 - Critical components
 - Material shortages
 - Current actions being taken to meet program schedules
 - Major or Single Source producers
 - Contractors' ability to surge production
- I.8 FAR 52.217-7 OPTION FOR INCREASED QUANTITY - SEPARATELY PRICED LINE ITEM (CLIN 2A CRITICAL SPARES)
 - CO may exercise the option by written notice to the Contractor within 2 years of contract award
- I.21 NFS 1852.204-75 SECURITY CLASSIFICATION REQUIREMENTS
 - Attachment J-38, *DD Form 254, Department of Defense Contract Security Classification Specification* will be updated post award



Terms and Conditions

- **H.6 NFS 1852.235-71 Key Personnel and Facilities**

- In accordance with NFS 1852.235-77, before removing, replacing, or diverting any of the personnel or facilities listed in the clause, the Contractor shall notify the Contracting Officer reasonably in advance

- Submit a justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on this contract.

- A bi-lateral modification will be issued to reflect updates to key personnel and facilities

- **H.13 Payments, Events and Accomplishment Criteria**

- The CO will unilaterally determine the Contractor's accomplishment and successful completion of each milestone in accordance with each Program Event



Terms and Conditions

- Data Rights

- K.21 52.227-15 REPRESENTATION OF LIMITED RIGHTS DATA AND RESTRICTED COMPUTER SOFTWARE

- Any identification of Limited Rights Data or Restricted Computer Software in the offeror's response is not determinative of the status of the data should a contract be awarded to the offeror
- Contractor is required to substantiate Limited Rights Data and Restricted Computer Software assertions with evidence through recorded information, the stages of development, and the source of funds at the lowest segregable level, that the technical data / software was developed wholly at private expense.

- H.17 IDENTIFICATION AND REPRESENTATION OF LIMITED RIGHTS DATA AND RESTRICTED COMPUTER SOFTWARE AFTER AWARD

- Attachment J-36, *Authorized Limited Rights in Data and Restricted Computer Software* outlines Limited Rights Data and Restricted Computer Software to be delivered in performance of this contract
- Contractor shall not deliver any data in performance of this contract with restrictive or limiting markings unless the data are listed in Attachment J-36, *Authorized Limited Rights in Data and Restricted Computer Software*
- Additional identification and representations may be made after award by submitting a request with substantiation to the CO



Terms and Conditions

- Data Rights (Cont.)

- I.16 FAR 52.227-14 RIGHTS IN DATA—GENERAL (MAY 2014) ALTERNATE II (DEC 2007) [(MODIFIED BY NFS 1852.227-14 (APR 2015))] ALTERNATE III (DEC 2007) ALTERNATE V (DEC 2007)

- The Government shall receive:

- Unlimited rights in data for (1) data first produced in performance of the contract; (2) form, fit, and function data delivered under the contract; (3) manuals or instructional and training materials for installation, operations or routine maintenance and repair of items, components or processes delivered or furnished under the contract; (4) all other data delivered under the contract not otherwise marked as Limited Rights Data or Restricted Computer Software
- Limited rights in data developed wholly at private expense; must be substantiated by contractor through financial and technical records and authorized by CO as documented in Attachment J-36, *Authorized Limited Rights in Data and Restricted Computer Software*

- Data delivered in performance of the contract shall contain the appropriate language outlined in the following notices:

- Government Rights Notice, Limited Rights Notice, and Restricted Rights Notice

- H.11 DATA CONTAINING AN INCORRECT NOTICE

- The Contractor shall be responsible for substantiating an incorrect notice at its own expense
- If the CO notifies the Contractor of an incorrect notice and the Contractor fails to remove or correct the marking within 60 days after receipt of such notice, the Government shall have the right to cancel or ignore the markings after said period and the data will no longer be made subject to any disclosure prohibitions

- H.12 INCORRECT NOTICE AND REQUIREMENTS FOR WRITTEN JUSTIFICATION OF RESTRICTED MARKINGS

- Incorrect notice means a marking placed on data or computer software delivered or otherwise furnished to the Government under this contract that is not in a format authorized by this contract

Data Markings



- Data delivered to NASA shall follow the Government-wide Controlled Unclassified Information (CUI) program standards
- Data delivered to NASA shall identify any NASA CO approved limited and/or restricted rights data per Attachment J-36 at the lowest segregable level. Other data within the deliverable that is not limited or restricted rights should not be globally marked as such.
- Data delivered with Export Control markings
 - SOW 2.5 Export Control The Contractor shall ensure that only specific data that has been identified as Export Administrative Regulations (EAR) and international Traffic in Arms Regulations (ITAR) designations is marked with an appropriate Destination Control Statement that includes the export classification and corresponding export authority. Other data within deliverable that is not export controlled should not be globally marked as EAR or ITAR
 - Attachment J-01 lists the expected EAR and ITAR markings. Be sure to included the Destination Control Statement that included export classification and corresponding export authority



Attachment J-30: Work Plans

- Work Plans include the contractual due dates by which the Contractor demonstrate successful completion of each milestone.
- CLIN 1 Work Plan effective at contract award
 - Includes the contractual due dates for CLIN 1 milestone completion dates.
- CLIN 2 Work Plan as proposed included in Attachment J-30, Work Plans
 - NASA requested to ATP NLT ^{(b) (4)} [REDACTED] per SpaceX proposal
- CLIN2A Option (if exercised) as proposed included in Clause I.8
 - NASA to exercise option, if required, NLT 2 years post contract award



CLIN5B Tasking

- CLIN 5B Tasking Approach
 - NASA identifies the list of tasks quarterly to be performed
 - NASA and SpaceX bilaterally agree on the Tier level for the quarter to accomplish the tasks
 - CLIN5B Task Order revised with the agreed to tier level for the quarter
 - At end of quarter, NASA and SpaceX bilaterally agree on task completion status

Unique Aspects



- USDV Acceptance
 - E.1 FAR 52.246-15 Certificate of Conformance
 - Contractor provides Certificate of Conformance with DD-250
 - E.5 Preliminary Inspection at Source and Final Inspection and Acceptance at Destination
 - Preliminary inspection for compliance with the contract specifications and requirements may be performed at origin
 - Final inspection occurs at Acceptance Destination
 - DRD USDV-36 USDV Acceptance Data
 - Contractor provides the objective evidence needed by NASA to establish the acceptability of integrated systems/hardware/software for its intended use in compliance with contract requirements
 - E.1 FAR 52.227-16 Additional Data Requirements
 - Enables CO to order additional data first produced or specifically used in the performance of the contract within 3 years after acceptance of all deliverable items
 - E.1 FAR 52.246-16 Responsibility for Supplies
 - NASA accepting title of all supplies delivered on this contract, including the USDV
- Indemnification for Unusually Hazardous Risks
 - NASA is working on the Indemnification requested
 - NASA Administrator is the approval authority



Unique Aspects

- Delegations:
 - COR
 - Property Administration and Plant Clearance
 - Quality Assurance



Upcoming DRD deliverables

- USDV-1 Program Management Plan (update at 30 working days after award)
- USDV-2 Program Management Review (data delivered last Thursday of month following quarter)
- USDV-3 Project Lifecycle Review Plan - MCR JIP due at Contract Kickoff
- USDV-6 WBS and WBS Dictionary (update at 30 calendar days after award)
- USDV-7 IMPDAR (monthly, NLT 6 Gov't workdays after contractor's month end)
- USDV-10 OCI Plan (final at 30 days after award)
- USDV-12 DEIA Plan (final at 30 working days after award)
- USDV-14 IT Security Management Plan (initial at 30 calendar days after award)
 - IT Security Plan (due 30 calendar days after requested by Gov't)
- USDV-15 Export Control Plan (final at 30 calendar days after award)
- USDV-16 Gov't Property Mgmt Plan (final at 30 calendar days after award)
 - Detailed Supplemental Gov't Prop Mgmt procedures (due 60 calendar days after award)
- USDV-18 Safety & Health Plan (initial at 30 calendar days after award) – Approved SpaceX request to extend to 45 calendar days after award.
- USDV-20 S&MA Plan (Vol 2) (initial at 30 calendar days after award) – Approved SpaceX request to extend to 45 calendar days after award.
- USDV-22 Mishap Preparedness and Contingency Plan (initial at 30 calendar days after award)
- USDV-27 Systems Eng Mgmt Plan (initial at 30 calendar days after award) – Approved SpaceX request to extend to 45 calendar days after award.



- **NASA Points of Contact for Information Security**
 - ISS Program Office Chief Information Security Officer (CISO) – (b) (6)
 - JSC Chief Information Security Officer (CISO) – (b) (6)
- **Information Security Incident Notification – NASA Security Operations Center (SOC)**
 - Email soc@nasa.gov (24x7)
 - 1-877-627-2732 (24x7)
- **Any Contractor information security related incidents involving NASA data, interfaces, or devices must be reported to the SOC as soon as possible.**
- **Reviews Information Technology Security Management Plan (ITSMP) and IT Security Plan**
 - Describes how the company safeguards any NASA information stored/processed by the company in support of the execution of the contract
- **The JSC Procurement Work Instruction related to JSC Security:**
 - 52.204-92 NASA Security Program and Identification of Employees. (Jul 2022) (JSC Procurement Instruction)



NASA IT and Physical Access

- Plan to use existing processes to onboard SpaceX employees for access to IT and Physical Access
- JF200 Card for USDV Contract currently on-file with JSC Security.
- SpaceX FSO to add an affiliation to any SpaceX employee working USDV to the USDV agreement in NAMS.
- SpaceX FSO to submit all NAMS requests for SpaceX-USDV personnel to COR for sponsoring.
- All SpaceX employees requiring NASA IT access must complete NASA IT security training every 365 days. If training lapses, the employee will be locked out of NASA IT systems.

Government Furnished Property Requests



- Requests for additional GFP may be considered by NASA but will require consideration pursuant to FAR 45.301 (d). Contract clause 52.245-9, Use and Charges, may apply.
- Include the following in all requests:
 - Reasons why contractor-owned property cannot be used.
 - Part number
 - Description of property
 - Flight Hardware (Y/N)
 - Quantity requested
 - Contract # and POC of contract to which the property is currently accountable (if applicable)
 - Need date (adequate notice required for consideration of request)
 - One of the following statements:
 - The property will be consumed in performance of services to the Government, or
 - The requested equipment will be returned in the same condition as existed prior to its loan and any costs associated with maintenance, recalibration, and/or repair to property used during the loan period shall be born by the contractor.



BACKUP

Key POC List



Name	Role	Email
Dana Weigel	OA/ISS Program Manager	(b) (6)
(b) (6)	ON1/ISS Transportation Integration Office Manager	
	ON5/Deorbit Vehicle Management Office Branch Manager	
	ON5/Deorbit Vehicle Project Manager	
	ON5/Mission and Integration Manager	
	ON1/USDV Business Manager	
	ON5/Safety and Reliability Lead	
	OA/Contracting Officer Representative	
	BG/Contracting Officer	
	OE/USDV Safety Lead	
	OD/Avionics and Software Lead	
	CA/FOD Lead Flight Director	
	EX/USDV Chief Engineer	

Limited and Restricted Rights Notices for USDV Contract



Limited Rights Notice (DEC 2007)

(a) These data are submitted with limited rights under Government Contract No. 80JSC024CA002. These data may be reproduced and used by the Government with the express limitation that they will not, without written permission of the Contractor, be used for purposes of manufacture nor disclosed outside the Government; except that the Government may disclose these data outside the Government to support service contractors and/or pursuant to agreements and contracts related to human exploration such as the ISS, Gateway, or Artemis programs for the following purposes, if any; provided that the Government makes such disclosure subject to prohibition against further use and disclosure:

- (i) Use (except for manufacture) by support service Contractors
- (ii) Evaluation by nongovernment evaluators.
- (iii) Use (except for manufacture) by other contractors participating in the Government's program of which the specific contract or agreement is a part.
- (iv) Emergency repair or overhaul work.
- (v) Release to a foreign government, contractors, or its instrumentalities, if required to serve the interests of the U.S. Government, for information or evaluation, or for emergency repair or overhaul work by the foreign government.

(b) This notice shall be marked on any reproduction of these data, in whole or in part.

Restricted Rights Notice (Dec 2007)

(a) This computer software is submitted with restricted rights under Government Contract No. 80JSC024CA002. It may not be used, reproduced, or disclosed by the Government except as provided in paragraph (b) of this notice or as otherwise expressly stated in the contract.

(b) This computer software may be-

- (1) Used or copied for use with the computer(s) for which it was acquired, including use at any Government installation to which the computer(s) may be transferred;
- (2) Used or copied for use with a backup computer if any computer for which it was acquired is inoperative;
- (3) Reproduced for safekeeping (archives) or backup purposes;
- (4) Modified, adapted, or combined with other computer software, provided that the modified, adapted, or combined portions of the derivative software incorporating any of the delivered, restricted computer software shall be subject to the same restricted rights;
- (5) Disclosed to and reproduced for use by support service Contractors or their subcontractors in accordance with paragraphs (b)(1) through (4) of this notice; and
- (6) Used or copied for use with a replacement computer.

(c) Notwithstanding the foregoing, if this computer software is copyrighted computer software, it is licensed to the Government with the minimum rights set forth in paragraph (b) of this notice.

(d) Any other rights or limitations regarding the use, duplication, or disclosure of this computer software are to be expressly stated in, or incorporated in, the contract.

(e) This notice shall be marked on any reproduction of this computer software, in whole or in part.