

United States Deorbit Vehicle
Questions and Answers

Question #	Question	Answer
1	<p>Can NASA provide access to the following attachments in the SAM.gov notice?</p> <p>JSC 66617, ISS Passive Thermal Control System (PTCS) Analysis Guide</p> <p>SSP 50290, Prime Item Development Specification for Node 2</p> <p>JSC 65795, NASA Docking System (NDS) Interface Definitions Document (IDD)</p>	<p>Yes. NASA posted Johnson Space Center (JSC) 65795, NASA Docking System (NDS) Interface Definitions Document (IDD) in the Technical Library on May 04, 2023, on the SAM.gov website for “International Space Station Deorbit Capability”.</p> <p>NASA has included JSC 66617, ISS Passive Thermal Control System (PTCS) Analysis Guide, in the Technical Library III file. SSP 50290, Prime Item Development Specification for Node 2 will be posted in the near future.</p>
2	<p>Can NASA provide the list of interested vendors for the ISS Deorbit opportunity?</p>	<p>Yes. NASA enabled the Interested Vendors List within the SAM.gov website “International Space Station Deorbit Capability” in Modification 7 on March 24, 2023. Parties that are interested in being included on the list shall use the “Add Me to Interested Vendors” button. If a vendor would like to be removed from the Interested Vendors List, they shall use the “Remove Me from Interested Vendors” button. A SAM.gov account sign-in is required to view and sign up for the Interested Vendors List.</p>

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3	The tentative procurement schedule provided in the Industry Day Q&A suggested that the Draft Solicitation for this effort is tentatively scheduled to be released last month with the Final Solicitation tentatively scheduled for the release in May. Is an updated procurement schedule available at this time?	Yes. The updated draft schedule is outlined on Chart 47 in the Presolicitation Conference Charts which was posted on May 8, 2023. The schedule is also outlined on the JSC Procurement United States Deorbit Vehicle website at the following location: https://www.nasa.gov/jsc/procurement/usdv
4	Can NASA provide information regarding facility activation costs and readiness to levels to process hardware for flight use for the following Orbiter components with a prior White Sands Test Facility (WSTF) Depot and/or associated testing capability: <ul style="list-style-type: none"> •OMS propellant tank, 73A740000 •RCS propellant tank, MC282-0061 •Primary RCS Thruster, MC467-0028 •AC Motor Valve, MC284-0430 •Relief Valve/Burst Disc Assembly, MC284-0421 •Quad Check Valve, MC284-0481 •Manual Valve, MC284-0480 	NASA has investigated the location, condition, programmatic ownership, and quantities of the requested legacy Space Shuttle Program hardware for potential use in United States Deorbit Vehicle (USDV) applications. After the review, NASA has concluded that providing the requested property is not in the Government's best interest and substantially increases the Government's assumption of risk. The hardware items requested are coming from bonded storage, controlled storage, and uncontrolled storage and have had minimal, if any, preventative maintenance. The hardware has a high risk of degraded performance given its age. Furthermore, the Government cannot guarantee the operational performance and margin, or suitability of use. The hardware requested presents a significant risk to the Government and populace for a single-use, must-work vehicle. As a result, NASA is not willing to accept the risk of providing these items for use to industry as a Government Furnished Property for use in this procurement.
5	Would the Space Shuttle Reaction Control System (RCS) jets be made available to Offerors as Government Furnished Equipment (material) for the USDV program?	See the answer to Question #4

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6	What atmospheric model and assumptions should be utilized in design analyses (Per SSP-30425, min, mean, or max)?	NASA will provide additional details on the atmospheric model and assumptions in the Baseline Space Station Program (SSP) 51101, USDV Systems Requirements Document (SRD) which will be posted in the Technical Library for the Request for Proposal.
7	In reference to SSP 51101 USDV SRD Section 3.1.4, the Requirements state that deorbit should be achieved for an ISS with mass of 450,000 kg. Will NASA provide an assumed ISS element configuration? Should it be assumed that some US or Russian visiting vehicles remain at ISS, or should we assume all US and Russian ports are empty except for the Node-2 forward (especially for ISS flights below 220 km)? Does NASA plan to provide full mass properties (mass, inertia, CM, aero properties) for use in USDV proposal analysis?	<p>NASA will provide an assumed International Space Station (ISS) element and visiting vehicle configuration for the deorbit sequence.</p> <p>NASA will provide a range of full mass properties for bounding scenarios in a future communication no later than the final RFP.</p>
8	In reference to SSP 51101 USDV SRD Section 3.3.4, is the requirement that the USDV shall maintain the capability to produce $[\pm 1,500, \pm 1,500, \pm 1,500]$ ft-lbf control authority upon demand or that those are the minimum torques that must always be used?	The USDV shall be capable of providing at least the control authority specified in SSP 51101, USDV SRD Section 3.3.4. NASA expects scenarios where less control authority could be used (ex. non-dynamic operations).
9	Based on SSP 51101 USDV SRD Section 3.2.1 Collision Avoidance, will NASA provide a requirement for USDV free-flight collision avoidance maneuver(s) prior to arriving upon ISS? How many, etc.?	No. NASA does not expect to provide a requirement for the quantity of free-flight (non-mated) collision avoidance maneuver(s) prior to arriving to ISS. The quantity of collision avoidance maneuvers during free flight will be dependent on the specific provider's free-flight trajectory and sequence (time in free flight).

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10	The SSP 51101 USDV SRD Requirements for Attitude Limits (3.3.5) and Attitude Rate Limits (3.3.6) state that the USDV shall maintain the integrated stack attitude/attitude rate during all other dynamic events within ± 2.0 deg/axis and ± 0.01 deg/s/axis with respect to the commanded attitude/rate, including vents and LoAC recovery. How will these requirements be applied during a LoAC recovery, which will definitely exceed these limits, such as with a time to effect?	The values for attitude and attitude rate in SSP 51101 USDV SRD Section 3.3.5c and 3.3.6c are intended to represent the requirement for when attitude has been recovered after a Loss of Attitude Control (LoAC). Additional attitude control requirements were provided in SSP 51101 USDV SRD which was posted to the Technical Library on May 3, 2023.
11	SSP 51101 USDV SRD 3.3.11 OPERATE INDEPENDENT OF ISS SERVICES states that “the USDV shall meet mated functional and performance requirements while operating for 4 days independent of ISS services.” Can we assume that the ISS systems will remain sufficiently operational to establish specific array positions (at least symmetrical) before the orbit shaping and deorbit burns occur? Or that the positions were set prior to the 4 day period? Also, is this requirement meant to apply only below 220 km altitude?	<p>Yes, ISS systems will remain sufficiently operational to establish specific solar array positions before the orbit shaping burn(s) and reentry burn occur.</p> <p>The requirement is intended to be bounded by the final 4 days on-orbit during the deorbit sequence; however, there may be scenarios where ISS services are interrupted to USDV during the nominal mated timeframe, as stated in the rationale of the requirement: While the sizing point will be the independence required for orbit shaping burn(s) and reentry burn, there may be times throughout the 1 year of mated operations, that services may be interrupted for shorter amounts of time, and the internal functions and reserves will support the vehicle during these interruptions.</p>
12	In reference to the SSP 51101 USDV SRD Introduction section indicates up to 4 rendezvous attempts (3 failed attempts and final successful). Sections 3.2.2, 3.2.3, and 3.2.4 collectively seem to indicate 5 failed attempts and one final successful docking. Please clarify how many failed attempts total.	The introduction is consistent with SSP 51101 USDV SRD Section 3.2.3, Perform Re-Rendezvous, where it states there will be three rendezvous aborts and a re-rendezvous required (a total of 4 attempts). SSP 51101 USDV SRD Section 3.2.2 and 3.2.4 are different capabilities and are not intended to stack up against Section 3.2.3.

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13	In reference to SSP 51101 USDV SRD Section 1.0, We understand that NASA has indicated the crew must not be required to tend the USDV during its one year docked to ISS. Does NASA anticipate a crew need to enter the USDV for other purposes, or may we preclude crew ingress into any USDV pressurized volume?	No, NASA does not anticipate a need for crew to access USDV. However, if the USDV interior is accessible to the Intravehicular Activity Crew, additional interface requirements would be levied.
14	The CONOPS addresses fault tolerance in Section 3.2.1 as follows: "USDV designs will be evaluated against ISS Safety's traditional two failure tolerant to a catastrophic hazard approach. The ISS Program recognizes that there are instances where a two-failure tolerant approach is not feasible. In instances where only single-failure tolerance to a catastrophic hazard is met, acceptance rationale will be focused on the system's reliability." Will NASA say more about how this will be defined, applied, and adjudicated during the program?	Yes, NASA-provided additional context and clarity on this topic may be found in the Technical Library document titled "ISS Deorbit Concept of Operations DRAFT B" posted on May 3, 2023, which was included in the DRFP release.
15	Should NASA choose to procure the Launch Vehicle separately from the USDV, how will NASA take inputs from the USDV contractor with respect to LV choice? To what degree would NASA be involved in the integration between the USDV contractor and the LV provider?	NASA provided additional clarity on the Launch Vehicle (LV) strategy, roles and responsibilities in the Technical Library document titled "USDV Launch Vehicle Summary" posted May 3, 2023, in the DRFP release, and NASA is soliciting feedback. NASA intends to use the established Launch Services Program process for the competitive selection of the LV. The provider can provide performance requirements as a part of the LSP process.

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16	Should NASA choose to perform USDV mission operations rather than the USDV contractor, what interactions and data would NASA expect between the NASA mission operations team and the USDV contractor? What participation and roles would NASA expect of the USDV contractor during USDV on-orbit operations?	NASA provided additional clarity on roles and expectations, which may be found in the Technical Library document titled “ISS Deorbit Concept of Operations DRAFT B” posted on May 3, 2023, in the DRFP release.
17	In reference to the ISS Deorbit Concept of Operations, is NASA wedded to the given Altitude Lower Plan, or can we propose alternate options that decrease altitude control propellant at the expense of more translational DV?	NASA’s requirement is to the 50 km vacuum perigee, but may consider other altitude-lowering profiles. The proposed USDV shall meet the requirements in SSP 51101 USDV SRD.
18	Will NASA use parts of the ISS to create feedstock materials for future orbital infrastructure projects, which would reduce the net mass requiring deorbit?	NASA has investigated alternative options, and disassembly of the ISS was deemed not viable, as detailed in Section 5.0: Alternate Concepts of the ISS Deorbit Concept of Operations posted on May 3, 2023, in the Technical Library. The complex hardware and software integration of the ISS would require significant investment to support partial disassembly and removal of any ISS elements and drive multiple vehicle launches and returns/disposals to support final ISS end-of-life.
19	In reference to the ISS Deorbit Concept of Operations, can NASA provide additional details on the needed attitude control propellant below 220 km?	Yes, NASA has released AAS 20-078 International Space Station Deorbit Controllability Analysis in the Technical Library III file.

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20	Is there a specific Solar Alpha Rotary Joint (SARJ)/Beta Gimbal Assembly (BGA) configuration we should be assuming for ISS flight beginning with the orbit shaping burn (at and below 220 km)?	Yes, more detail on the SARJ and BGA configuration was provided in the ISS Deorbit Concept of Operations posted to the Technical Library on May 3, 2023.
21	Is the contractor allowed to adjust the fixed-price production prices given changes made during cost-plus design phase? If not, what parameters does the Govt expect the Contractor to base FFP pricing on, given the open-ended nature of cost-plus government directed design phase?	Unlike exploration programs with undefined requirements, the USDV project requirements are well-defined due to known interfaces and requirements that identifies clear parameters to base a Firm Fixed Price. The Concept of Operations (ConOps) and SSP 51101 USDV SRD are well-defined, and NASA does not expect significant government-driven changes to be made in the cost-plus design phase. In particular, NASA does not anticipate NASA driven changes that would affect the scope of work in Firm Fixed Price (FFP).
22	Why is the design phase cost-plus?	NASA took into account many factors: the magnitude of non-reoccurring engineering for the deorbit requirements, the reliability approach, risk to public safety, the USDV being a single-use vehicle, NASA's experience with complex FFP developments, and industry feedback. NASA chose a balanced approach with Cost Plus and FFP.

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23	Is this considered a “new start” and therefore require an approved NASA budget in FY24 or would funding be available even if on CR?	<p>NASA has authorization language which allows the USDV to begin in FY24 even if we have an extended duration Continuing Resolution. For the full project run-out, NASA does need a new budget.</p> <p>The President’s Fiscal Year 2024 Budget Request includes a request for appropriations for the USDV project. This request includes the entirety of the USDV project life-cycle key elements including but not limited to USDV procurement, Launch Vehicle procurement, ISS integration, testing and integrated analysis, Launch Vehicle integration, ground systems, simulators, flight operations, training, any Government Task Agreements, and Government Furnished Property.</p>
24	On page 16 of the Presolicitation Conference charts, it notes that CLIN 2 Core pricing is valid for one year. We thought we heard verbally that it was 2 years. Please clarify.	<p>Clause B.4 CLIN 2 PRODUCTION, ASSEMBLY, INTEGRATION, AND TEST outlines that the price is valid for up to one year beyond the proposed CLIN 2 Core Authority to Proceed (ATP) date.</p> <p>Clause I.7 FAR 52.217-7 OPTION FOR INCREASED QUANTITY - SEPARATELY PRICED LINE ITEM (CLIN 2A CRITICAL SPARES) (MAR 1989) outlines that the Contracting Officer may exercise the option by written notice to the Contractor within 2 years of contract award.</p>
25	The contracting approach seems likely to lead to either (1) high bids for the FFP due to risk, or (2) underbid FFPs targeting change orders. Why the aversion to an early study phase with multiple contractors, and a rolling down select through PDR	<p>Because the USDV requirements are well-defined, unlike with an exploration program, the requirement stability is key for Firm Fixed Price. In addition, the schedule and budget do not support a study phase followed by a downselect at Preliminary Design Review due to the necessity of an early contingency capability.</p>