International Space Station (ISS) Commercial Resupply Services 2 (CRS2) Request for Proposal (RFP) NNJ14507542R Questions and Answers Posting #3

63. VII.C Pricing Evaluation - Consistent with NASA's price evaluation adjustment based on "rent free" use of government equipment, property or services, will NASA also consider any potentially unfair competitive advantage that may result from a Contractor's use of Payload Processing Capabilities (reference Attachment V.M.) in accordance with FAR 45.202? Specifically, will NASA adjust upward any evaluated price for Offeror's who propose using the payload processing capabilities at KSC?

A. In accordance with FAR 45.202, NASA will adjust for use of government equipment, property or services where 2 or more offerors are given different prices for use of the same piece of equipment, property or services at the same location. This adjustment will ensure offerors using the same approach to fulfilling the contract requirements are treated equally. The purpose of the Government Services, Facilities or Equipment Template is to identify any differences in the offerors GFEPS costs, verify these costs and then make an appropriate adjustment if the findings substantiate an adjustment.

The payload preparation capabilities at KSC as defined in Attachment V.M., which were offered in II.A.25, will be removed from II.A.25 in an amendment to the RFP. These capabilities will still be available at KSC but Offerors will be required to request this NASA support in accordance with Clause II.A.26. and thus the price of use of the facilities will be part of the proposed costs. Similarly, use of other NASA facilities, such as JSC's Mission Control Center, NASA integration facilities, and NASA tracking and commanding sites, should follow this same process.

64. In the "Small Business Subcontracting" section of the RFP, NASA requests a table with a breakdown of the offeror's proposed small business goals, expressed in terms of percent of total contract value and percent of subcontracting value. In the case the offeror submits a commercial small business plan, is this table still required? Expressing the goals in these terms with a commercial plan would not be clear, as the goals expressed in the commercial plan are for all commercial items over a one year period, not for one specific contract over the duration of that contract. If this table is required regardless, please provide detailed instruction for adapting commercial plan goals to the table structure.

A. If a commercial small business plan is submitted, you will not be required to fill out the Table A. An amendment will be made to the RFP to clarify.

65. In section 4.1.3.5.2 of Attachment V.A. Statement of Work, the primary statement includes the word "reentry" however the list of bullets does not mention reentry. Please clarify that the bullets take precedent and those are the only items that are required to satisfy this aspect of ISS Integration Certification Milestone 5.

A. Correct, a complete demonstration flight including reentry is not required for a return vehicle. The intent of the Milestone 5 was to demonstrate proof of the key capabilities that would enable a successful reentry on the first mission.

66. Do the following requirements from SSP 50808, 3.3.7.2.4 Caution and Warning, apply to the CRS2 vehicle – an uncrewed vehicle, with ISS crew temporarily inside it?
"J. During attached operations, crewmembers shall be provided the capability to silence both ISS and crewed COTS vehicle C&W tones from within the crewed COTS vehicle.
K. During attached operations while the crewed COTS vehicle is in non-quiescent ops mode (powered on), the crewed COTS vehicle shall provide visual and auditory annunciations in the crewed COTS vehicle in accordance with CCT-REQ-1130, paragraph 3.10.4.5 for an ISS event based on ISS originated C&W status as defined in the vehicle specific software ICD listed in Appendix D."

A. No, because the CRS2 vehicles are not "crewed COTS" vehicles.

67. Are Offerors required to provide a clean, executable copy of the Original Model Contract with TBP's filled in and no header or footer?

A. The model contract should only contain the header and footer that was included in the RFP posting and not the Offeror's information (see RFP Q&A #60). Offerors should fill in the TBP's (Spaces entitled: "To be proposed").

68. What variances to technical and mission requirements were granted to CRS-1 providers? Further, will these variances be granted in CRS-2?

A. Variances granted to CRS-1 providers are not relevant to the CRS2 RFP or contracts. The requirements for CRS2 are different than CRS-1. If a CRS2 offeror wishes to request a variance or deviation to the requirements, they should follow the instructions in Section VI.A.21 4. Deviations and/or Exceptions (Mission Suitability Proposal).

69. In regards to the CRS2 solicitation, other than the very sparse online list of interested vendors is there any other list of interested vendors that will be made public; such as, a list of those entities who attended the pre-proposal conference or a list of those entities that submitted questions.

A. NASA does not publish the names of the companies that attended the Pre-Proposal Conference nor the names of the companies that submitted questions to the Contracting Officer. NASA only publishes the list of companies that asked to be included in the Interested Parties List. A final update will be made to the Interested Parties List before the proposal due date. The CRS2 website will have the available list.

70. Section II.A.25 government Furnished Services and Data of the RFP identifies services and data that the Government will make available on a no-charge-for-use basis to the Contractor to fulfill its contractual obligations.

a) If offerors intend to use any of the services/data listed here, how do they notify NASA of that intent?

A. The offerors intent to use the services and data available as listed in II.A.25 is information that should be discussed in the Mission Suitability Volume as part of the offeror's overall strategy.

b) Do they include items listed in II.A.25 in the GFEPS template? (is this the mechanisms for notifying the Government (as part of its proposal) of an offerors intention to use/not use these services/data?)

A. Yes, the items should be included in the GFEPS template. Both the Mission Suitability Volume and the GFEPS template are mechanisms for notifying the Government.

c) Where do offerors specify the scheduled need date and length of time needed for GFS&D (Services/facilities/data)?

A. For the Services and Data listed in II.A.25, the information should be discussed in the Mission Suitability Volume as part of the offerors overall strategy.

71. Attachment V.J. (Government Furnished Property) lists the NASA Docking System Block 1 as GFP and a "Contractor requested – TBP."

a) If offerors want/need other GFP, is this table the NASA preferred mechanism for requesting said property?

A. Information on Government Furnished Property offerors want/need should be requested in the Offer Volume with the notification of the offeror's intent to use the property offered in Attachment V.J. An amendment will be made to the RFP to clarify.

Please note that a request for support obtained from a NASA Center or Component Facility should be requested in accordance with Clause II.A.26. The Task Plan Point of Contact List Letter to Offerors posted with Amendment 01 to the RFP has a list of NASA contacts.

b) How/where would offerors indicate the need date for any GFP?

A. See response to RFP Q&A #71. a).

72. VI.A.11 List of Available Government Property (NFS 1852.245-81) states that "The Offeror shall notify the Government, as part of its proposal, of its intention to use or not use the property in Attachment V.J. Do offerors include the items listed here in the GFEPS? (Is the GFEPS the mechanism to notifying the Government of an offeror's intention to use or not use the GFP?)

A. Yes, offerors should include the items listed in Attachment V.J. in the GFEPS pricing template. The intent to use the items should also be included in the Offer Volume. (See RFP Q&A #45, 70)

73. Please clarify the distinction between what NASA seeks bidders to provide in Section T2 and Section M2, so that bidder avoids repeating information and/or runs the risk of being evaluated twice for the same information.

A. In section T2., (the technical section) the Offeror is to describe its technical approach, risks and plans for meeting the ISS integration certification requirements. In section M2., (the management section) the Offeror shall describe the proposed schedule for performance of the milestones both for the ISS integration certification and for the missions. Specifically, with regard to ISS integration in section M2., the Offeror was requested to propose ISS integration milestones and associated payment amounts.

74. There appears to be a discrepancy between dates for SORR and FRR provided in Section 3.5.5 and dates provided in "Road to ISS Integration" graphic. Is SORR to be held at L-4 or L-3.5 weeks? Is FRR expected at L-2 or L-1 week? [ref: SSP 50964]

A. The SORR timeframe is approximately L-1 month and FRR is in the L-2 week to L-1 week time period. A specific L-number of days is not guaranteed for each flight as timing must be managed in consideration with other ISSP reviews and other program priorities. The specific schedule, content, presentation and assessment expectations for each SORR shall be defined in the SORR Announcement Memorandum produced and distributed by the NASA ISS Program Office prior to the SORR. Note that a NASA FRR is

generally held for the first launch of a VV and only thereafter if significant changes have been made to the vehicle.

75. A new revision to SSP 30599 Rev F (Draft) was introduced as an applicable document between the draft RFP and the final RFP. This new draft version is significantly different than the Rev E version including significantly different lists of products for each phase. The CRS1 efforts involved developing a common understanding between NASA and the CRS provider of safety products and processes with respect to SSP 30599. Much of the new Draft document appears to align more closely with the approach followed under CRS1, but at the same time can be read to significantly expand or modify the products delivered under the approach taken for CRS1. Is NASA's intent to significantly change the processes and products provided under CRS1 such that all hazard analysis and products would need to be re-done even if the same product is offered under CRS2 as was offered under CRS1? Or is the intent to clean up the SSP documentation of the process to better align with current processes and the safety processes/products are not expected to significantly change compared to those for CRS1?

A. The revision to SSP 30599 Rev F (Draft) updates the document to reflect the current safety process and provides a unified process between safety review panels. The CRS2 offerors should review the scope of the changes documented in SSP 30599 Rev F (Draft) and determine the impact associated with what is being requested in the CRS2 RFP.

76. SSP 30309 Rev G (Draft) introduces the ISS Hazard System (https://hazard.iss.nasa.gov) and indicates it "provides for the capability of electronic data management", but does not require it. Does CRS2 require all hazard reports developed by CRS1 providers to be modified and introduced into this database? If so, will this require re-review of all hazard reports by the SRP?

A. Yes, CRS2 providers are required to utilize the ISS Hazard System database per SSP 30599 Rev F (Draft) paragraph 4.5. All CRS2 hazard reports will be reviewed and approved by the SRP.

77. Introduction of C2V2 as the command and telemetry system for uncrewed cargo vehicles introduces a number of questions that we would like clarification on:

a) SSP 50964 indicates that verification of C2V2 capability will use a VV emulator. Is there a requirement for the CRS2 provider to supply an emulator to NASA for verifying C2V2 capabilities or is NASA providing C2V2 test capabilities for testing of the CRS2 providers capabilities at their own facilities? If the CRS2 provider is supplying the emulator, are there requirements (capabilities, delivery vs loan, support required, etc.)?

A. No, there is not a requirement for the CRS provider to provide a VV emulator for RF ICD compliance testing however, the VV provider will be expected to perform integrated testing at JSC with a VV flight equivalent unit. The VV emulator referenced in the RF ICD is in development for C2V2 Comm Unit RF ICD compliance testing. NASA did develop a C2V2 Compatibility Test Set (CCTS) for RF ICD compliance testing of the CRS2 C2V2 compatible communication system. NASA can supply C2V2 test equipment to the providers for early testing at their facilities.

b) Redundancy switching timing on C2V2 is required to be implemented such that it occurs within 35 seconds per SSP 50930. Although this is within the allowable timing for loss of communication under 50808 to meet ISS monitoring needs, it is not clear if it matches the design implementation needed to meet safety requirements under failed capture. Safety critical commanding under failed capture can be, and has been under CRS1, the driving design requirement for commanding system redundancy switch-over timing. With the change to using C2V2 should the CRS2 provider assume evaluation of failed capture recovery associated with 35 second time to fail over needs to be costed and that NASA (and CSA if needed) support will be provided? Note that the failed capture safety evaluation can be an intensive NASA/CSA/CRS provider effort that can be strongly impacted by changes in timing. Or should the CRS2 provider assume that NASA has already evaluated the timing and has determined it to be adequate and will accept increase in risk associated with longer switch-over timing?

A. The 35 second failure over time is applicable to the ISS side of the C2V2; that is, it specifies the time for the ISS C2V2 to failover to its backup string and recover communications. The CRS2 provider requirement to complete redundancy switching is specified in paragraph 3.3.7.1.2.3 of SSP 50808 (for reference, specified as 50 seconds). The CRS2 provider should factor in the time for the ISS redundancy switching when showing compliance with the SSP 50808 redundancy switching requirement. For example, the C2V2 FDIR can be set to trigger failover after loss of communications exceeding X seconds (the value of X is configurable by ground operators). If a failure occurs in the CRS2 vehicle transmitter, the C2V2 FDIR will trigger if X time is exceeded without communications. RF communications in that scenario will not be recovered until both the C2V2 and the CRS2 have completed failing over to the backup communication systems and acquired RF signal lock. The C2V2 FDIR requirements applicable to the C2V2 Comm Unit are contained in SSP 41175-39. A “white paper” describing the C2V2 FDIR is available; however the C2V2 PIDS and SSP 41175-39 contain the C2V2 FDIR requirements.

c) SSP 50930 indicates that the time to fail over does not address uncrewed docked vehicles that “would probably require a more rapid time to fail over due to automated docking”. This statement is consistent with the ATV IRD which requires a much shorter time for allowable interruptions. How will NASA address this issue identified in the C2V2 spec for CRS2 providers that propose a docking vehicle? Should the CRS2 provider assume that there will be no change to requirements or capabilities associated with time to fail over, actions associated with loss of communication, monitoring of uncrewed vehicles, or ISS crew commanding for a proposal that includes docking of uncrewed vehicles?

A. NASA understands that there is a gap in the requirements related to uncrewed docking vehicle and the time to fail over. An update to SSP 50808 will be forthcoming to provide requirements for uncrewed docking vehicles. Depending on when the requirement is defined, NASA will determine how it impacts the procurement. The provider should not assume that there will be no changes to the requirements at this time.

d) SSP 50930 indicates that some failure detection, isolation and recovery of the command/telemetry capability will be automated and some will be manual. Are there single failures that can result in loss of communication that will require manual FDIR? If so, will this be accomplished within 35 seconds or is there a separate timeframe that needs to be accounted for?

A. Yes, there are single events (like a failed cable) that could result in loss of communications that could require manual FDIR. The requirement is that the visiting vehicle has to meet the Loss of Communications requirements and safe operate itself (which is 50 or 120 seconds, depending on where you are in the approach ellipsoid). It is unlikely that a manual FDIR action could be accomplished in the required timeframe.

e) It is not clear what the FDIR and time-to-fail-over capabilities are from an "ISS crew to CRS2 vehicle back to the ISS crew" command and telemetry standpoint. There is information about C2V2 RF system and about C2V2 to ISS, but it is not clear what the closed loop FDIR capability is from a crew command and display station to the vehicle and back. Is there a fully automated FDIR to cover failures anywhere along the system such that if the crew sends a command to the CRS2 vehicle and does not get confirmation that the command has been accepted the crew can resend the command after an automated fail over to a redundant path? What is the maximum time of the fail over for failures anywhere along the system (not just on C2V2 RF system)?

A. If a command is sent to the CRS2 vehicle, the vehicle must provide either an acknowledgement of receipt of the command or a notification of command rejection. If a command rejection is sent, the command can be resent. The maximum time of the fail over is dependent on the radio system and vehicle interactions which are dependent on the design of the visiting vehicle. Timing analysis will have to be performed and integrated with the rest of the system to determine the risk when managing hazards. Consult SSP 41175-39 for the ISS C2V2 FDIR requirements and the C2V2 FDIR white paper for a description of the dependencies between the C2V2 FDIR and the CRS2 communication system.
As described in SSP 50934 C2V2 RF ICD, the C2V2 generates a frame count (aka heartbeat) that it sends with every channel access data unit (CADU) over the RF to the CRS comm system. The RF ICD also specifies that the vehicle comm system should echo back the last received frame count. That frame count is used by C2V2 to assess the status of the RF link and can be used by ISS CCS as an FDIR trigger. In addition, the RF ICD describes additional telemetry provided on the forward link (ISS to vehicle) to indicate two way heartbeat status (good or bad), as well as whether the C2V2 receiver has frame lock with the VV (i.e., locked to the attached sync marker (ASM) sent with every CADU).

f) SSP 50930 indicates that the redundancy switching shall not lead to link interruptions of more than 35 seconds from failure detection to re-establishment of the link. What is the longest time from failure occurrence until re-establishment of the link (i.e. including time to detect the failure)?

A. Per SSP 50930 and SSP 41175-39, the C2V2 Comm Unit reports the status if the Transmitter, Receiver, and Comm Unit at the rate of 10 Hz. In addition, the C2V2 Comm Unit reports a 1553 frame count at 10 Hz. If CCS receives three consecutive indications that the Transmitter, Receiver, or Comm Unit have failed, then FDIR is triggered if it enabled and a valid back up exists (see SSP 41175-39 for the requirements). If the 1553 frame count is stale or invalid for 3 consecutive times, then FDIR is triggered if FDIR is enabled and a valid backup is available (again see SSP 41175-39 for the requirements). If an anomalous condition exists which causes the C2V2 Comm Unit to report a failed transmitter, receiver, or Comm Unit, those failure indications will be valid within 1 second (TBR) (e.g., if the transmitter power is below threshold, it will be reported at 10 Hz as soon as the Comm Unit detects it).

   In addition, the C2V2 FDIR has a response to loss of communications, as determined by the C2V2 Comm Unit assessment of the VV Heartbeat Status. See SSP 41175-39 for the requirements, and the "White Paper" for a description. The FDIR response time to loss of VV heartbeat is configured by the ground operators/FOD (e.g., it can be set to trigger after 300 msec of loss of communications, set to trigger after 30 seconds of loss of communications, etc).

78. The Applicable Documents table in the RFP shows SSP 30309 Rev G (Draft) as applicable and SSP 50808 Rev E as applicable. SSP 50808 Rev E shows SSP 30309 Rev F as applicable. Does the RFP supersede the Applicable Documents section in SSP 50808 such that requirements in SSP 50808 that reference SSP 30309 should actually use SSP 30309 Rev G (Draft) instead of Rev F? Or is SSP 30309 Rev F still applicable for all requirements in SSP 50808?

A. Yes, the RFP supersedes the Applicable Documents section in SSP 50808. SSP 50808 Applicable Documents List and associated requirement references will be updated in SSP 50808 via DCN as soon as SSP 30309 Rev G is baselined. For purposes of the CRS2 RFP, offeror's should use SSP 30309 Rev G and assume the callouts in SSP 50808 will be updated to Rev G as well.

79. The Applicable Documents table in the RFP lists JSC 66617 as an applicable document. The RFP calls out JSC 66617 in DRD CRS 3-2 under the "Format" sub-section of the "Deliverables" section of item #8 "Deliverables Preparation". It states: "Refer to JSC 66617, ISS PTCS Analysis Guide, for additional information". This appears to address the JSC 66617 as a reference document. Does listing this as an applicable document convey additional responsibilities for JSC 66617 beyond what is described in the DRD? For example does it mean that the CRS2 provider will be subject to some/all of the requirements in JSC 66617 (as opposed to using it for additional information)? We would like to recommend that NASA either list JSC 66617 as a reference document or identify which paragraphs within JSC 66617 are requirements applicable to the CRS2 provider, which require verification closure documentation, which are guidelines, and which are to be referred to for additional information, or further clarify the impact of making the document an "Applicable Document".

A. An amendment to Attachment V.K. will be made to show that JSC 66617 is a reference document for the DRD. The entire JSC 66617 is a generic document that describes roles and responsibilities in passive thermal control, different types of analysis approaches, and requirement and model expectations with regards to the DRD deliverable and verification closure of SSP 50808 paragraph 3.2.2.6.2.4 as stated.

80. The Applicable Documents table in the RFP adds the following new applicable documents: SSP 42004 Part 1&2, SSP 57003, SSP 57003-ELC, SSP 57004, SSP 57004-ELC and SSP 42131, and also includes SSP 42003 Part 1&2. However the RFP does not state which requirements/sections in these documents are applicable to the CRS2 provider. Does listing these documents as applicable documents in the RFP along with the reference to the carrier "interface" mean only requirements associated with the carrier to ISS interface are applicable (independent of the payload) or does the CRS2 provider become responsible for execution and verification of all analysis associated with these documents including payload interface and integration onto the carrier (i.e. ensure the payload provider meets all of the requirements) and interfaces with the MSS and ISS? If the payload impacts the carrier interface with the ISS or MSS (such as data, electrical, bonding, thermal, etc.) is the CRS2 provider responsible for analysis and verification of these requirements including the payload aspects? Can NASA clarify what responsibilities the CRS2 provider has for the requirements within these documents? We would like to recommend that these either be moved to reference documents or specific responsibilities for these documents be clarified with enough detail that the associated effort can be costed.

A. The applicability of these documents will depend upon the characteristics of the CRS2 provider's vehicle design and are intended for an unpressurized carrier design that requires deployment and attachment to ISS via any of the ISS attach sites. The CRS2 provider is responsible for performing the analytical integration of the assembly including the payload and integration onto the carrier. If the unpressurized carrier must interface with the ISS, then the CRS2 provider must verify the interface between the carrier and these systems. Verification of any payload developer FSE is the responsibility of the payload

developer. Specific paragraph applicability to the carrier will be worked during the requirements development phase as described in SSP 50964.

81. The RFP for CRS1 included a list of government supplied hardware (FRGF, EVA/IVA labels, NASA Standard Detonators). The RFP for CRS2 does not include any government supplied hardware, only the NASA Docking System Block 1 as government furnished equipment (with the associated cost). Will NASA be providing any government supplied equipment/property? If not, will NASA be providing either build to print data for any equipment or detailed specs for building equipment of any specialized hardware such as FRGFs or NASA Standard Detonators? Will NASA be able to provide this detail in time to include as a cost element in the response to the RFP? If there is no GSE equipment, will NASA be offering as GFE any of the equipment that was listed in the CRS1 RFP as GSE and provide NASA costs for that equipment?

A. The offeror is able to request other GFP (including test equipment or flight hardware) (See RFP Q&A #71).

82. SSP 50964 includes a list of BDEALS "Required Data Items" in Appendix G. Some of these are new to the CRS2 program. This Appendix is identified as "A list of typical DIDs" in Section 3.4.3. Bidders need to appropriately cost for requirements and need to know which items are required vs. “should” statements. Can NASA identify the specific DIDs and identify the process and products the data is to be used for along with the required support from the CRS2 provider for these processes and products?

A. SSP 50964 lists “typical” BDEALS, BHSEALS, and Joint Verification Events based on previous CRS experience – these represent the vast majority of deliverables that are expected. The final list of deliverable are negotiated after contract award during the development of a CRS provider-specific Join Integration, Verification, and Test plan, dependent on the VV design.

83. The Applicable Documents table in the RFP lists SSP 50123 as an applicable document and DRD CRS 1-2 indicates that the CRS2 Provider’s Configuration Management Plan will define the requirements, responsibilities, and procedures for the Contractor’s CM system pursuant to SSP 50123 as it applies to this contract. The RFP does not state which sections within SSP 50123 will apply to the contract or what CM products need to be addressed. (a) Will the Configuration Management plan be applied only with respect to SSP 50808 and SSP 50833 requirements? (b) With respect to responsibilities, is the CRS2 provider considered an “NASA CONTRACTOR” when (i.e. will maintain the COSMOS Database reflecting the current status of the SSCN from initiation through closure, review every ISS CR, manage a CMRD and ERU, etc.)? (c) Is the CRS2 provider expected to develop a CM plan to initiate and process ISS CRs per the process described in this document? (d) Could NASA please clarify which sections of SSP 50123 apply to the CRS2 provider, what classification within SSP 50123 applies to the CRS2 provider (NASA contractor, Program Participant, etc.), and which products must be included in the configuration management plan (i.e. just SSP 50808 and SSP 50833 that are applied to the CRS2 provider?).

A. See below.
   a. The CM Plan will be applied on how the CRS2 provider would maintain configuration control/management within their company and not necessarily to SSP 50808 and/or SSP 50833. The CM Plan should consist of how the CRS2 provider would maintain configuration control/management of any hardware, software, or documentation developed by that CRS2 provider for traceability from inception to implementation.

b. Yes, CRS2 provider would be considered a NASA Contractor; however, the CRS2 provider would not update/maintain the COSMOS database as the NASA Transportation Integration Office would be the ones working any ISS Change Requests (CRs) pertaining to CRS2 and therefore, follow the processes defined in SSP 50123. However, the CRS2 provider would have to review CRs for possible updates and/or changes to requirements and provide to the ISS Program any impacts that may occur. These CR reviews are described in the SOW.
c. No, the CRS2 provider is not expected to develop a CM plan to initiate and process ISS CRs per the process described in the document.
d. As for what should be in the CM Plan, it is defined in CRS 1-2 Description/Purpose, to describe the assignment of responsibility organizationally and the procedures that the provider would use to accomplish the specific configuration management requirements as required. Define the requirements, responsibilities and procedures that the CRS2 provider will be using to maintain the configuration control of their items (i.e., hardware, software, documentation).

84. The Applicable Documents table in the RFP lists SSP 50108 and SSP 50902 as applicable documents and Section 2.12 of the SOW states that the Contractor shall adhere to the processes defined in these documents. These documents each have a section identifying CRS provider responsibilities, but the majority of the documents appear to define NASA's roles. Can NASA define which sections within these documents are applicable to the CRS provider and which are reference information? For example is the CRS provider's role completely defined by paragraph 1.7.4 in SSP 50108 and by paragraph 4.5.1 in SSP 50902 with all products, processes and requirements to support NASA defined roles identified in other contract documents such as DRDs? If making these documents "applicable documents" creates a requirement for any new products not defined elsewhere in the RFP, such as in the DRDs, can NASA identify these products?

A. The CRS2 provider shall be responsible only for the sections relating to the CRS provider responsibilities. SSP 50108 is the overall ISS CoFR process and paragraphs 1.7.4 does define the roles, responsibilities, and products required of the CRS provider for SORR. SSP 50902 is the specific Transportation Integration Office roles/responsibilities within the CoFR process. All paragraphs that mention CRS provider are applicable.

85. The Applicable Documents table in the RFP lists SSP 50482 as an applicable document and SOW paragraph 4.1.3.5.8 states that the Visiting Vehicle Avionics Simulation for use in testing in the SDIL will be in accordance with SSP 50482, but does not list which sections within SSP 50482 are to be applied. SOW paragraph 4.1.3.5.8.a states that the hardware and software maintained by the Contractor will be in accordance with SSP 50482, but SSP 50482 does not appear to include hardware and appears to indicate a visiting vehicle simulator would not be "in-scope" of for SSP 50482 (per paragraph 1.2 Scope or Section 6 In-Scope Software). If the emulator is actually in scope, does this mean that all aspects of SSP 50482 need to be followed for the simulator (i.e. the MASCB is responsible for the management of the software change process, the software is to be delivered per Section 5, etc.)? Paragraph 4.1.3.5.8.b indicates that Training of NASA personnel to operate simulator is to be in accordance with SSP 50482, but it is unclear which section within SSP 50482 defines requirements for training NASA personnel. Can NASA identify what sections in SSP 50482 are to be applied to the simulator, it what respect is the simulator to be considered in-scope, and what aspects of the hardware and software are to governed by the document?

A. A visiting vehicle simulator is considered in scope of SSP 50482. The ISS Software Management Plan and other related topics will be discussed as part of the first TIM with awardees. The ISS SMP manages all ISS software. Join testing is performed with an integrated test configuration that includes

both ISS avionics and software and the visiting vehicle interfaces. The visiting vehicle simulator requirements will be discussed in relation to the SMP's fidelity requirements. That is, the fidelity will be sufficient to verify that the flight software interacts correctly.

86. Will NASA be providing a fault tolerant vehicle commanding capability through C2V2 that meets requirements for safety critical, time critical commanding? Will NASA or the CRS2 provider need to demonstrate, verify, and document this capability to meet safety requirements such as fault tolerance, must-work function for safety critical commands, must-not-work for inadvertent commands, and general computer based control system (CBCS) requirements?

A. The visiting vehicle provider has to meet their SSP 50808 requirements. ISS has its own requirement to meet in support of that document. There will be an integrated hazard analysis to demonstrate the integrated system meets the overall requirements.

87. In DCN 135B for SSP 50808, a change has been applied to paragraph 3.3.1 (which applies to all docking vehicles) that now references paragraph 3.3.7.5.2.3 (which applies only to crew vehicles). Our understanding of the purpose of 3.3.7.5.2.3 was to provide the capability for a crew vehicle to safely depart a damaged ISS that can no longer control attitude and that cargo vehicles do not need to provide the same capability. The rate established for this ISS tumble has been applied through DCN 135B to a docking uncrewed cargo vehicle for a scenario where the cargo vehicle cannot complete a docking due to a contingency. Does this interpretation match the intent of the requirement? If it does, it appears that applying this rate means that the ISS was either tumbling prior to docking contact or accelerates to the tumble rate during the 30 minutes between docking contact and contingency departure (note that docking contact cannot create this type of acceleration of the ISS). The magnitude of design impacts of this requirement depend on when the accelerations to create the tumble are applied as the docking vehicle will not be rigidly attached to ISS (i.e. it is a partial docking scenario). Docking with these ISS rates at the point of docking contact will impact the capture mechanism, vehicle navigation and loads. Docking with ISS at the spec rates followed by a rotational acceleration of ISS after initial capture impacts the docking damping mechanisms and loads. The timing of when the acceleration to ISS is applied to obtain these ISS rates will impact the departure dynamics of the docking vehicle impacting the trajectory after release for plume analysis (as departing from ISS with high tumble rates when not rigidly attached will create large dispersions on trajectories and jet firing/distance from ISS arrays). Note that the initial ISS rates used in the analysis to determine the tumble rates in 3.3.7.5.2.3 (based on the document referenced in the DCN) is multiple times larger than the ISS spec rates and can result in departure from ISS due to a failed docked with the ISS pitching at four times orbital rate in the opposite direction of orbital rate. Can NASA please confirm if the intent was to reference the crew vehicle requirement rates and apply them to a cargo vehicle? Can NASA also identify when the acceleration to create the ISS rates should be applied (before or after initial docking capture) to allow the designers to evaluate the design impacts? Can NASA also confirm that these high ISS rates can be counted as a failure (or more than one failure) when evaluating fault tolerance for the system with respect to safety requirements?

A. Yes, SSP 50808 requirement 3.3.3.1 is for an uncrewed VV during a failed docking attempt and the reference to the crewed requirement (3.3.7.5.2.3) was simply to share data on the rate used for each requirement. An initial impulse force is applied due to the failed capture/rigidization, resulting in some inertial rate slightly greater than nominal orbit rate. After 30 minutes of free-drift, the 0.28 dps is a possible inertial rate due to the initial rate at Loss of Attitude Control (LoAC) and additional dynamic effects. NASA docking system initial contact conditions are defined in JSC 65795. According to the

current docking plan, LoAC during thruster inhibit for docking contact and rigidization is not a failure. LoAC means free-drift, and ISS will start to tumble. If rigidization is not completed in the expected time, CMG control alone, with thruster inhibited, will have limited time to keep the ISS from tumbling.

88. The new version of SSP 30309 (Rev G draft) in the RFP changes the definition of critical and catastrophic hazard to change "orbiter" to "visiting vehicle". Depending on how this is interpreted, this could have very important consequences. Can NASA clarify if the visiting vehicles are only vehicles already at the ISS or include the visiting vehicle approaching the ISS and/or include a visiting vehicle departing the ISS (i.e. including the CRS2 vehicle the hazard report is being developed for)?
Note that if it includes the vehicle approaching, and the vehicle is disposed after a mission, then failing to successfully dock/berth to ISS would result in the loss of the visiting vehicle and be a catastrophic hazard by this definition. This would put a requirement on the visiting vehicle to be able to dock/berth to ISS after two failures (i.e. 2 fail op) in order to meet fault tolerance to catastrophic hazard requirements. As the vehicle must be able to withstand a failure during approach and still keep ISS safe, and it must be operational after two failures, it must then withstand at least three failures to ensure the safety of the ISS. This would result in extreme redesign of vehicles currently certified to go to ISS.
If this only applies to vehicles that are currently attached to the ISS, this puts cargo vehicles at a more critical rating than "an ISS element" as loss of an ISS element is only a critical failure. As many cargo vehicles are actually disposed of after use, why are these more critical than an ISS element? We would like to recommend that this modification be reconsidered and perhaps limited to something like "loss of capability to return ISS crew."

A. NASA intends to modify the final SSP 30309 (Rev G) to clarify the definition of a catastrophic hazard as it relates to a crewed visiting vehicle. CRS2 providers are still required to ensure they protect against any catastrophic hazard associated with loss of the ISS during all visiting vehicle ISS proximity and integrated operations (approach, integrated operations, and departure), which will require them to be two fault tolerant.

89. VI.A.21, 3, Subfactor B-Management Approach, M1, requests information regarding any proposed subcontractors, team members or joint venture partners, but does not define these terms or provide factors to determine which subcontractors, etc., to include. Nor does it provide an anticipated threshold total contract value amount as provided in the VI.A.23, Past Performance (though it is noted Past Performance instructions ask for "major" team members, etc.).

a. What anticipated contract value threshold or other factors should Offerors use to determine subcontractors, team members, joint venture partners or suppliers with respect to the Management Approach section.

A. Any entity that will be performing work should be included.

b. Can an Offeror identify only "major" subcontractors, team members, joint venture partners or suppliers in the Management Approach section? If so, what anticipated contract value threshold or other factors should Offerors use to determine such "major" subcontractors, team members, joint venture partners or suppliers in this section?

A. All entities performing work should be included.

Corrections to RFP Q&A Round 1

25. P.206, Attachment V.M. Payload Processing Capabilities Required at the Launch Site, 2. Facilities, ISSES - Bullet seven in the list of ISSES features, states “Chamber environment continuously monitored and supported by Kennedy Space Center (KSC) personnel.” We request changing “KSC personnel” to “NASA personnel”.

A. ~~NASA concurs that “KSC personnel” should be “NASA personnel” and will make the update in an amendment to the RFP.~~ “KSC Personnel” will be removed from the RFP in an amendment to show that the chamber environment should be continuously monitored, but responsibility of who monitors depends on the facility designated by the Offeror.