SpaceX Commercial Crew Transportation Capability Contract (CCtCap)
NNK14MA74C

SpaceX Commercial Crew Transportation Capability Contract

Attachment J-01 - Integrated Crew Transportation System (CTS) Requirements

Attachment J-03 - Performance Work Statement (PWS)

Attachment J-03, Appendix A - Milestone, Acceptance Criteria and Payment Schedule

Modification 01 to Attachment J-03, Appendix A

SOLICITATION, OFFER AND AWARD

1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700)	RATING	PAGE OF PAGES
	DO-C9	1 of 168

2. CONTRACT NUMBER	3. SOLICITATION NUMBER	4. TYPE OF SOLICITATION	5. DATE ISSUED	6. REQUISITION/PURCHASE NUMBER
NNK14MA74C	NNK14467515R	☐ SEALED BID (IFB) ☒ NEGOTIATED (RFP)	11/19/2013	4200529082

7. ISSUED BY	CODE	8. ADDRESS OFFER TO (If other than Item 7)
NASA/John F. Kennedy Space Center Office of Procurement Mail Code: OP Kennedy Space Center, FL 32899	KSC	Attn: Rogelio Curiel NASA/John F. Kennedy Space Center Mail Code: SEB-CERT Kennedy Space Center, FL 32899

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

SOLICITATION

9. Sealed offers in original and SECTION L copies for furnishing 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 REFER TO SECTION L until 1200 EST (Hour) local time 01/22/2014 (Date)

CAUTION: LATE Submissions, Modifications, and Withdrawals: See Section L, Provision No. 52.214-7 or 52.215-1. All offers are subject to all terms and conditions contained in this solicitation.

10. FOR INFORMATION CALL:	A. NAME	B. TELEPHONE (NO COLLECT CALLS) AREA CODE	NUMBER	EXT.	C. E-MAIL ADDRESS
	Rogelio Curiel	321	867-7498		ksc-cp2@mail.nasa.gov

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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 270 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 price 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 No. 52.232-8)	10 CALENDAR DAYS (%)	20 CALENDAR DAYS (%)	30 CALENDAR DAYS (%)	CALENDAR DAYS (%)
	N/A	N/A	N/A	N/A

14. ACKNOWLEDGEMENT OF AMENDMENTS (The offeror acknowledges receipt of amendments to the SOLICITATION for offerors and related documents numbered and dated):	AMENDMENT NO.	DATE	AMENDMENT NO.	DATE
	01	12/20/2013		
	02	4/22/2014		

15A. NAME AND ADDRESS OF OFFEROR	CODE	FACILITY	16. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)
Space Exploration Technologies Corp. 1 Rocket Road Hawthorne, CA 90250	3BVL8	3BVL8	Gwynne Shotwell President

15B. TELEPHONE NUMBER AREA CODE	NUMBER	EXT.	15C. CHECK IF REMITTANCE ADDRESS ☐ IS DIFFERENT FROM ABOVE - ENTER SUCH ADDRESS IN SCHEDULE	17. SIGNATURE	18. OFFER DATE
310	363-6229			[redacted]	7/07/2014

AWARD (To be completed by government)

19. ACCEPTED AS TO ITEMS NUMBERED	20. AMOUNT	21. ACCOUNTING AND APPROPRIATION
All	$1,115,023,687.00	

22. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION: ☐ 10 U.S.C. 2304 (c) ( ) ☐ 41 U.S.C. 253 (c) ( )	23. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified)	ITEM
		See Schedule G

24. ADMINISTERED BY (If other than Item 7)	CODE	25. PAYMENT WILL BE MADE BY	CODE
		See Schedule G	NSSC

26. NAME OF CONTRACTING OFFICER (Type or print)	27. UNITED STATES OF AMERICA (Signature of Contracting Officer)	28. AWARD DATE
Dudley R. Canon, Jr.	[redacted]	9-16-2014

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

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J.1 LIST OF ATTACHMENTS..... 112

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SECTION B. SUPPLIES OR SERVICES AND PRICES/COSTS

B.1 NFS 1852.216-78 FIRM FIXED PRICE (DEC 1988)

The total firm fixed price of this contract is the total amount shown in Table B.2, *Services To Be Provided.*

(End of Clause)

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

The Contractor shall provide all resources necessary to deliver and/or perform the requirements of the contract in accordance with the following table and per clause C.1, *Specification/Statement of Work*, except for resources provided by the Government under clause G.6, *NFS 1852.245-76 List of Government Property Furnished Pursuant to FAR 52.245-1 (Jan 2011)* and clause H.12 *Government Furnished Services and Data*.

Table B.2 Services To Be Provided

CLIN Category	CLIN	Title	Price
Fixed Price Core Contract	001	Design, Development, Test, and Evaluation (DDTE)/Certification	$ [redacted]
Fixed Price IDIQ	002	Post Certification Missions (PCM)	TBD
Fixed Price IDIQ	003	Special Studies	TBD
		Total:	[redacted]

TBP: To Be Proposed / TBD: To Be Determined / IDIQ: Indefinite Delivery Indefinite Quantity / CLIN: Contract Line Item Number

(End of Clause)

B.3 Design, Development, Test and Evaluation (DDTE)/Certification (Core Contract) (CLIN 001)

NASA Certification under CLIN 001 is complete when the Contractor's Crew Transportation System (CTS) has met NASA's requirements for safely transporting crew to and from the International Space Station (ISS) in accordance with documents identified in Section C.1, *Specifications/Statement of Work*. SubCLINS 001A and 001B, identified in Table B.3, *DDTE/Certification SubCLINs*, are delivery milestones that represent completion of required work necessary to achieve NASA Certification. Delivery payment for the ISS Design Certification Review (DCR) for the crewed flight to the ISS includes all work under this CLIN that occurs from the contract effective date through the ISS DCR completion. The delivery payment for the Certification Review (CR) will include all work that occurs from the ISS DCR delivery date through the end of the DDTE/Certification CLIN 001.

Table B.3 DDTE/Certification SubCLINs (CLIN 001)

CLIN Category	CLIN	Title	Price
Fixed Price	001A	ISS Design Certification Review (ISS DCR)*	[redacted]
Fixed Price	001B	Certification Review (CR)	[redacted]
Sub-Total (CLIN 001 Firm Fixed Price (FFP))			[redacted]

*ISS DCR is the DCR for the crewed flight to ISS

(End of Clause)

B.4 POST CERTIFICATION MISSIONS (IDIQ) (CLIN 002)

In accordance with clause C.1, *Specification/Statement of Work*, the task ordering procedures and other terms and conditions in the contract, the Contracting Officer may issue Post Certification Mission (PCM) task orders. The Contractor shall use the Mission pricing rates shown in Table B.4.1, *Post Certification Mission Prices*. The per mission prices are for a single order at the price stated per the Calendar Year (CY) based on the number of missions ordered. CTS full mission capability prices shall be based on (1) fulfillment of the design reference mission to the ISS found in CCT-DRM-1110, *Crew Transportation System Design Reference Missions,* Attachment J-03, *Contract Performance Work Statement*, and other terms and conditions in the contract and (2) all inherent CTS capabilities that are within the proposed mission prices.

Post Certification Missions require at least [redacted] prior to launch to account for the lead time to accomplish all procurement, production and integration tasks required to execute a PCM. This lead time ensures that facilities, equipment, hardware, and personnel are available to build the vehicles and complete all required programmatic, safety, manufacturing, training, and integration tasks on-schedule.

The minimum quantity of Post Certification Missions in this contract is two (2). PCM task orders will not be issued until the Contractor has accomplished the criteria shown in clause H.19, *Post Certification Mission Payments, Milestones and ATP Criteria*, paragraph (a).

The maximum potential number of Post Certification Missions which may be ordered under this contract is six (6).

Table B.4.1 Post Certification Mission Prices (CLIN 002)

Calendar Year Ordered	Price Per Mission Based on order quantity of One (1)	Unit Price Per Mission Based on order quantity of Two (2)	Unit Price Per Mission Based on order quantity of Three (3)	Unit Price Per Mission Based on order quantity of Four (4)
2015	[redacted]	[redacted]	[redacted]	[redacted]
2016	[redacted]	[redacted]	[redacted]	[redacted]
2017	[redacted]	[redacted]	[redacted]	[redacted]
2018	[redacted]	[redacted]	[redacted]	[redacted]
2019	[redacted]	[redacted]	[redacted]	[redacted]
2020	[redacted]	[redacted]	[redacted]	[redacted]

Table B.4.2 Post Certification Mission Task Order List (CLIN 002)

Task Order Number	Description	Firm Fixed Price Amount
*To be filled in by Government as Task Orders are issued during contract performance	TBD	TBD
	TOTAL	**TBD**

(End of Clause)

B.5 SPECIAL STUDIES SERVICES (IDIQ) (CLIN 003)

In accordance with Attachment J-03, *Contract Performance Work Statement*, the task ordering procedures and other terms and conditions in the contract, the Contractor shall perform special studies, test and analyses, as initiated by written direction from the Contracting Officer. IDIQ tasks may include performing technical, cost, schedule and risk assessments for potential new or changes to existing requirements, as identified by the Government, for their impact on the Contractor's design, schedule and cost/price as it relates to CCtCap or life cycle activities; performing additional analyses, modeling, and/or tests of hardware or software to provide further confidence and understanding of robustness of design and advance planning, feasibility or trade studies for development or certification activities. These IDIQ tasks do not include any work necessary to accomplish the requirements under CLIN 001 and CLIN 002. The Contractor shall utilize the fully burdened labor rates shown in Table B.5.1, *Special Studies Labor Rates* when proposing to a Government Request for Task Order Proposal. The maximum potential total value of all Special Studies IDIQ tasks which may be ordered under this contract is $150 million.

Table B.5.1 Special Studies Labor Rates

Labor Rates							
Labor Category	**CY14**	**CY15**	**CY16**	**CY17**	**CY18**	**CY19**	**CY20**
Professional / Technical (Exempt)	[redacted]						
Ops./Mfg. (Non-Exempt)	[redacted]						

Table B.5.2 Special Studies Task Order List (CLIN 003)

Task Order Number	Description	Firm Fixed Price Amount
*To be filled in by Government as Task Orders are issued during contract performance	TBD	TBD
	TOTAL	**TBD**

(End of Clause)

SECTION C. DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK

C.1 SPECIFICATION/STATEMENT OF WORK

The purpose of the Commercial Crew Program (CCP) is to facilitate the development of a U.S. commercial crew space transportation capability with the goal of achieving safe, reliable and cost effective access to and from low Earth orbit (LEO) including the International Space Station (ISS) no later than 2017. Once the capability is matured and available, NASA intends to purchase commercial crew transportation services to meet its ISS crew rotation and emergency return needs.

NASA is using a two-phased acquisition to certify fully integrated Crew Transportation Systems (CTS) that meet specified NASA safety and ISS requirements and standards, and begin missions to the ISS. Phase 1, the Certification Products Contract (CPC), requires delivery and disposition of specified early lifecycle plans and products that address CTS compliance with NASA's standards and requirements for an ISS design reference mission. The CPC deliverables mature in parallel with the maturation of the CTS design. Phase 2, the Commercial Crew Transportation Capability (CCtCap), is the requirement of this contract as described below.

Requirements:
The Contractor shall complete the design, development, test, evaluation, and certification of an integrated CTS capable of transporting NASA crew to and from the ISS, in accordance with the design reference missions and the certification standards and requirements specified in this contract. Certification of the CTS shall be determined by NASA. The Contractor shall provide special studies for risk reduction and other purposes related to its CTS, to the extent ordered under CLIN 003 of this contract. The Contractor shall also provide complete, initial Post Certification Missions to and from ISS including ground, launch, on-orbit, return and recovery operations, as ordered by IDIQ tasks under this contract.

(a) The Contractor shall provide all facilities, resources, personnel, items or services necessary to perform the requirements specified in Section B, *Supplies or Services and Prices/Costs* (except for Government furnished property as listed in clause G.6, NFS 1852.245-76, *List Of Government Property Furnished Pursuant To FAR 52.245-1* and *Government Furnished Services and Data* as listed in clause H.12) in accordance with the following:

Attachment J-01, *Integrated Crew Transportation System Requirements*
Attachment J-02, *Data Requirement Deliverables (DRDs)*
Attachment J-03, *Contract Performance Work Statement (PWS)* – To be proposed by Offeror
Attachment J-03, Appendix A, *Milestone Acceptance Criteria and Payment Schedule* – To be proposed by Offeror

(b) Section C incorporates Attachments J-01, J-02 and J-03 into the Schedule. In case of a conflict, Attachment J-01 shall take precedence over Attachments J-02, and J-03. Attachment J-03 shall take precedence over Attachment J-02.

(End of Clause)

SECTION D. PACKAGING AND MARKING

D.1 CLAUSES INCORPORATED BY REFERENCE -- SECTION D

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 full text of the clause is available at the addresses contained in clause I.1 52.252-2, *Clauses Incorporated by Reference*, of this contract.

NFS 1852.211-70 PACKAGING, HANDLING, AND TRANSPORTATION. (SEP 2005)

(End of Clause)

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.

(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:

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

(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)

SECTION E. INSPECTION AND ACCEPTANCE

E.1 CLAUSES INCORPORATED BY REFERENCE -- SECTION E

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 full text of the clause is available at the addresses contained in clause I.1 52.252-2, *Clauses Incorporated by Reference*, of this contract.

NFS 1852.246-73 HUMAN SPACE FLIGHT ITEM (MAR 1997)

(End of Clause)

E.2 52.246-4 INSPECTION OF SERVICES AND RESEARCH AND DEVELOPMENT WORK - FIXED-PRICE (AUG 1996) (Deviation)

(a) Definition: "Services," as used in this clause, includes services performed, workmanship, and material furnished or utilized in the performance of services.

(b) The Contractor shall provide and maintain an inspection system acceptable to the Government covering the services and Research and Development (R&D) work under this contract. Complete records of all inspection work performed by the Contractor shall be maintained and made available to the Government during contract performance and for as long afterwards as the contract requires.

(c) The Government has the right to inspect and test all services and R&D work called for by the contract, to the extent practicable at all times and places during the term of the contract. The Government may also inspect on the premises of the Contractor or any subcontractor engaged in contract performance. The Government shall perform inspections and tests in a manner that will not unduly delay the work.

(d) If the Government performs inspections or tests on the premises of the Contractor or a subcontractor, the Contractor shall furnish, and shall require subcontractors to furnish, at no increase in contract price, all reasonable facilities and assistance for the safe and convenient performance of these duties.

(e) Inspection and test by the Government does not relieve the Contractor from responsibility for failures to meet the contract requirements that may be discovered before acceptance. Government failure to inspect and accept or reject the services or R&D work shall not relieve the Contractor from responsibility, nor impose liability on the Government, for nonconforming services or R&D work. Acceptance shall be conclusive, except for latent defects, fraud, gross mistakes amounting to fraud, or as otherwise specified in the contract.

(f) The Government has the right to reject nonconforming services or R&D work. Nonconforming services or R&D work is when it is defective in material or workmanship or is otherwise not in conformity with contract requirements.

(g) If any of the services or R&D work do not conform with contract requirements, the Government may require the Contractor to perform the services or R&D work again in conformity with contract requirements, at no increase in contract amount. If acceptance is not conclusive for any of the causes in paragraph (e), in addition to any other rights and remedies provided by law, or under other provisions of this contract, or when the defects in services or R&D work cannot be corrected by reperformance, the Government may -

(1) Require the Contractor to take necessary action to ensure that future performance conforms to contract requirements; and

(2) Reduce the contract price to reflect the reduced value of the services or R&D work performed.

(h) If the Contractor fails to promptly perform the services again or to take the necessary action to ensure future performance in conformity with contract requirements, the Government may –

(1) By contract or otherwise, perform the services and charge to the Contractor any cost incurred by the Government that is directly related to the performance of such service; or

(2) Terminate the contract for default.

(i) The rights in paragraph (g) and (h) of this clause are superseded by the conditions in clause H.21, *Post Certification Mission Success Determination*, specific only to the Post Certification Mission (PCM) flights. For these flights, the rights in clause H.21 regarding acceptance (mission success determination), payment procedures in the event of a determination for other than full mission success and waiver of the Government requirement's to re-perform the final PCM flight, shall apply.

(End of Clause)

F.1 CLAUSES INCORPORATED BY REFERENCE -- SECTION F

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 full text of the clause is available at the addresses contained in clause I.1 52.252-2, *Clauses Incorporated by Reference*, of this contract.

52.242-15 STOP-WORK ORDER. (AUG 1989)

52.242-17 GOVERNMENT DELAY OF WORK. (APR 1984)

(End of Clause)

F.2 DELIVERY AND/OR COMPLETION SCHEDULE

The Contractor shall deliver and/or complete performance of the items required under this contract as follows:

(a) CLIN 001, *DDTE/Certification*: The date of delivery for work performed under this contract is from date of award through completion of the last required milestone in Attachment J-03, Appendix A, *Milestone Acceptance Criteria and Payment Schedule*.

Milestone delivery and completion dates are defined in Attachment J-03, Appendix A for CLIN 001.

(End of Clause)

F.3 PLACE OF PERFORMANCE

The principal place of performance shall be The United States Of America.

(End of Clause)

SECTION G. CONTRACT ADMINISTRATION DATA

G.1 CLAUSES INCORPORATED BY REFERENCE -- SECTION G

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 full text of the clause is available at the addresses contained in clause I.1 52.252-2, *Clauses Incorporated by Reference*, of this contract.

NFS 1852.227-70 NEW TECHNOLOGY. (MAY 2002)

(End of Clause)

G.2 NFS 1852.227-72 DESIGNATION OF NEW TECHNOLOGY REPRESENTATIVE AND PATENT REPRESENTATIVE. (JUL 1997)

(a) For purposes of administration of the clause of this contract entitled "New Technology" or "Patent Rights - Retention by the Contractor (Short Form)," whichever is included, the following named representatives are hereby designated by the Contracting Officer to administer such clause:

New Technology Representative
Technology and Integration Office, Mail Code: KSC-NET
NASA, John F. Kennedy Space Center
Kennedy Space Center, FL 32899

Patent Representative
Office of Chief Counsel, Mail Code: KSC-CC
NASA, John F. Kennedy Space Center
Kennedy Space Center, FL 32899

(b) Reports of reportable items, and disclosure of subject inventions, interim reports, final reports, utilization reports, and other reports required by the clause, as well as any correspondence with respect to such matters, should be directed to the New Technology Representative unless transmitted in response to correspondence or request from the Patent Representative. Inquires or requests regarding disposition of rights, election of rights, or related matters should be directed to the Patent Representative. This clause shall be included in any subcontract hereunder requiring a "New Technology" clause or "Patent Rights - Retention by the Contractor (Short Form)" clause, unless otherwise authorized or directed by the Contracting Officer. The respective responsibilities and authorities of the above-named representatives are set forth in 1827.305-370 of the NASA FAR Supplement.

(End of Clause)

G.3 APPOINTMENT OF CONTRACTING OFFICER REPRESENTATIVE

(a) Performance of the work under this contract is subject to the functions of the Contracting Officer Representative (COR), who shall be specifically appointed by the Contracting Officer in writing in accordance with NASA FAR Supplement (NFS) 1842.270. The COR will serve as the Contracting Officer's technical liaison with the Contractor by providing performance monitoring; review of Contractor's progress; support to Government Insight activities as defined in clause H.15, *Government Insight*; or furnishing similar monitoring for work within the scope of the contract.

(b) The COR does not have the authority to, and shall not, issue any instruction or direction that:

(1) Constitutes an assignment of additional work outside the statement of work;

(2) Constitutes a change as defined in the changes clauses in I.2, *Clauses Incorporated by Reference*;

(3) Constitutes a basis for any increase or decrease in contract requirements; or any contract price; or the time required for contract performance;

(4) Changes any of the expressed terms, conditions, or specifications of the contract; or

(5) Interferes with the Contractor's rights to perform the terms and conditions of the contract.

(c) If, in the Contractor's opinion, any communication by the COR is deemed to be an instruction or direction that falls within any of the categories defined in paragraph (b) of this clause, the Contractor shall not proceed but shall notify the Contracting Officer in writing within five (5) working days after receiving it and shall request the Contracting Officer to take action as described in this clause. Upon receiving this notification, the Contracting Officer shall either issue an appropriate contract modification within a reasonable time or advise the Contractor in writing within fifteen (15) days that the communication is -

(1) Rescinded in its entirety; or

(2) Within the functions of the COR and does not constitute a change under the changes clauses of the contract, and that the Contractor should continue to proceed with contract performance.

(d) A failure of the Contractor and Contracting Officer to agree that the communication by the COR does not constitute a change under the changes clauses in I.2, or a failure to agree upon the contract action to be taken with respect to the communication, shall be subject to the Disputes clause of this contract.

(e) Any action(s) taken by the Contractor in response to any instruction or direction given by any person other than the Contracting Officer shall be at the Contractor's risk.

(End of Clause)

G.4 NFS 1852.245-73 FINANCIAL REPORTING OF NASA PROPERTY IN THE CUSTODY OF CONTRACTORS. (JAN 2011)

(a) The Contractor shall submit annually a NASA Form (NF) 1018, NASA Property in the Custody of Contractors, 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 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 directly 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: NASA, John F. Kennedy Space Center, Attn: OP-OS-IP, Industrial Property Officer, Kennedy 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 15. 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 15. Some activity may be estimated for the month of September, if necessary, to ensure the NF 1018 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 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 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.

(2) 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 reports in accordance with NFS subpart 1845.71 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 1852.245-75 PROPERTY MANAGEMENT CHANGES. (JAN 2011)

(a) The Contractor shall submit any changes to standards and practices used for management and control of Government property under this contract to the assigned property administrator prior to making the change whenever the change -

(1) Employs a standard that allows increase in thresholds or changes the timing for reporting loss, damage, or destruction of property;

(2) Alters physical inventory timing or procedures;

(3) Alters recordkeeping practices;

(4) Alters practices for recording the transport or delivery of Government property; or

(5) Alters practices for disposition of Government property.

(End of Clause)

G.6 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 on a no charge-for-use basis pursuant to the clause at FAR 52.245-1, *Government Property (Alt I)*, as incorporated in this contract. The Contractor shall use this property in the performance of this contract at the Contractor’s facility and at other location(s) as may be approved by the Contracting Officer. Under FAR 52.245-1 (Alt I), the Contractor is accountable for the identified property.

Description	Part Number (Docking Adapter Kit Docking Adapter Assembly)	Acquisition Value	Quantity	Available Date
NASA Docking System Block 1 (NDSB1) Flight Unit 1	683-100100-0001 683-100000-0001	$14,000,000	0	02/2016
NDSB1 Flight Unit 2	683-100100-0001 683-100000-0001	$14,000,000	0	04/2016
NDSB1 Flight Unit 3	683-100100-0001 683-100000-0001	$14,000,000	0	06/2016
NDSB1 Flight Unit 4	683-100100-0001 683-100000-0001	$14,000,000	0	08/2016

The Government understands that the NDSB1 Flight Units may be consumed in performance of this contract.

(End of Clause)

G.7 NFS 1852.245-78 PHYSICAL INVENTORY OF CAPITAL PERSONAL PROPERTY. (JAN 2011)

(a) In addition to physical inventory requirements under the clause at FAR 52.245-1, *Government Property*, as incorporated in this contract, the Contractor shall conduct annual physical inventories for individual property items with an acquisition cost exceeding $100,000.

(1) The Contractor shall inventory -

(i) Items of property furnished by the Government;

(ii) Items acquired by the Contractor and titled to the Government under the clause at FAR 52.245-1;

(iii) Items constructed by the Contractor and not included in the deliverable, but titled to the Government under the clause at FAR 52.245-1; and

(iv) Complete but undelivered deliverables.

(2) The Contractor shall use the physical inventory results to validate the property record data, specifically location and use status, and to prepare summary reports of inventory as described in paragraph (c) of this clause.

(b) Unless specifically authorized in writing by the Property Administrator, the inventory shall be

performed and posted by individuals other than those assigned custody of the items, responsibility for maintenance, or responsibility for posting to the property record. The Contractor may request a waiver from this separation of duties requirement from the Property Administrator, when all of the conditions in either (1) or (2) of this paragraph are met.

(1) The Contractor utilizes an electronic system for property identification, such as a laser bar-code reader or radio frequency identification reader, and

(i) The programs or software preclude manual data entry of inventory identification data by the individual performing the inventory; and

(ii) The inventory and property management systems contain sufficient management controls to prevent tampering and assure proper posting of collected inventory data.

(2) The Contractor has limited quantities of property, limited personnel, or limited property systems; and the Contractor provides written confirmation that the Government property exists in the recorded condition and location;

(3) The Contractor shall submit the request to the cognizant property administrator and obtain approval from the property administrator prior to implementation of the practice.

(c) The Contractor shall report the results of the physical inventory to the property administrator within 10 calendar days of completion of the physical inventory. The report shall -

(1) Provide a summary showing number and value of items inventoried; and

(2) Include additional supporting reports of -

(i) Loss in accordance with the clause at 52.245-1, Government Property;

(ii) Idle property available for reuse or disposition; and

(iii) A summary of adjustments made to location, condition, status, or user as a result of the physical inventory reconciliation.

(d) The Contractor shall retain auditable physical inventory records, including records supporting transactions associated with inventory reconciliation. All records shall be subject to Government review and/or audit.

(End of Clause)

G.8 SUBMISSION OF INVOICES FOR PAYMENT

(a) The Contractor shall submit invoices for the work completed in accordance with Attachment J-03, Appendix A, *Milestone Acceptance Criteria and Payment Schedule* and task orders issued under this contract. The designated billing office for invoices for purposes of clause FAR 52.232-25, *Prompt Payment*, in I.2, *Clauses Incorporated by Reference*, is indicated below. Invoices shall include a reference to the number of this contract.

(b) Original invoices shall be submitted to:

NASA Shared Services Center
Financial Management Division (FMD)
Accounts Payable
Building 1111, C Road
Stennis Space Center, MS 39529-6000
Phone: 1-877-677-2123
Fax: 1-866-209-5415
e-mail: NSSC-AccountsPayable@nasa.gov

(c) Additional copies shall be furnished to:

Copy 1:
Contracting Officer, Mail Code: OP-MS
NASA, John F. Kennedy Space Center
Kennedy Space Center, FL 32899

Copy 2:
Commercial Crew Program Office, Mail Code: FA-A
NASA, John F. Kennedy Space Center
Kennedy Space Center, FL 32899

(End of Clause)

G.9 REQUIREMENTS FOR DATA OTHER THAN CERTIFIED COST OR PRICING DATA

NASA has waived the Certified Cost or Pricing Data required per FAR 15.403-4 for contractors but not subcontractors. "Certified Cost or Pricing Data" means cost or pricing data that is required to be submitted in accordance with FAR 15.403-4 and 15.403-5 and have been certified, or are required to be certified, in accordance with 15.406-2. Certified Cost or Pricing Data will not be required for contract modifications and task orders of any amount under this contract. In lieu of Certified Cost or Pricing Data, the Contractor shall submit "Data Other Than Certified Cost or Pricing Data" as defined in FAR 2.101, if required by the Contracting Officer as part of the Contractor's proposal to support any contract price adjustments. This data may be requested such as in the case when the Contracting Officer issues a contract modification, a change order in

accordance with the *Changes* clauses in I.2 or any Request for Task Order Proposal issued per CLIN 002 or CLIN 003 of this contract.

(End of Clause)

SECTION H. SPECIAL CONTRACT REQUIREMENTS

H.1 CLAUSES INCORPORATED BY REFERENCE -- SECTION H

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 full text of the clause is available at the addresses contained in clause I.1 52.252-2, *Clauses Incorporated by Reference*, of this contract.

NFS 1852.223-75 MAJOR BREACH OF SAFETY OR SECURITY. (FEB 2002)

NFS 1852.225-70 EXPORT LICENSES. (FEB 2000) -- ALTERNATE I (FEB 2000)
Paragraph (b): Any NASA installation

NFS 1852.244-70 GEOGRAPHIC PARTICIPATION IN THE AEROSPACE PROGRAM. (APR 1985)

NFS 1852.246-70 MISSION CRITICAL SPACE SYSTEM PERSONNEL RELIABILITY PROGRAM. (MAR 1997)

(End of Clause)

H.2 NFS 1852.216-80 TASK ORDERING PROCEDURE. (OCT 1996) (Deviation)

(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.

(b) Prior to issuing a task order, the Contracting Officer shall provide the Contractor with the following data:

(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 acknowledgment of receipt to the Contracting Officer within 5 working 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 were 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.

(End of Clause)

H.3 NFS 1852.223-72 SAFETY AND HEALTH (SHORT FORM). (APR 2002)

(a) Safety is the freedom from those conditions that can cause death, injury, occupational illness; damage to or loss of equipment or property, or damage to the environment. NASA's safety priority is to protect: (1) the public, (2) astronauts and pilots, (3) the NASA workforce (including Contractor employees working on NASA contracts), and (4) high-value equipment and property.

(b) The Contractor shall take all reasonable safety and occupational health measures consistent with standard industry practice in performing this contract. The Contractor shall comply with all Federal, State, and local laws applicable to safety and occupational health and with the safety and occupational health standards, specifications, reporting requirements, and any other relevant requirements of this contract.

(c) The Contractor shall take, or cause to be taken, any other safety, and occupational health measures the Contracting Officer may reasonably direct. To the extent that the Contractor may be entitled to an equitable adjustment for those measures under the terms and conditions of this contract, the equitable adjustment shall be determined pursuant to the procedures of the Changes clause of this contract; provided, that no adjustment shall be made under this Safety and Health clause for any change for which an equitable adjustment is expressly provided under any other clause of the contract.

(d) The Contracting Officer may notify the Contractor in writing of any noncompliance with this clause and specify corrective actions to be taken. In situations where the Contracting Officer becomes aware of noncompliance that may pose a serious or imminent danger to safety and health of the public, astronauts and pilots, the NASA workforce (including Contractor employees working on NASA contracts), or high value mission critical equipment or property, the Contracting Officer shall notify the Contractor orally, with written confirmation. The Contractor shall promptly take and report any necessary corrective action. The Government may pursue appropriate remedies in the event the Contractor fails to promptly take the necessary corrective action.

(e) The Contractor (or subcontractor or supplier) shall insert the substance of this clause, including this paragraph (e) and any applicable Schedule provisions, with appropriate changes of designations of the parties, in subcontracts of every tier that exceed the micro-purchase threshold.

(End of Clause)

H.4 NFS 1852.232-77 LIMITATION OF FUNDS (FIXED- PRICE CONTRACT). (MAR 1989)

(a) Of the total price of all CLIN items identified in Section B, the sum of $129.3M 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 as required by the payment schedules in Attachment J-03, Appendix A, *Milestone Acceptance Criteria and Payment Schedule* and task

orders awarded under CLIN 002 and 003 (see table B.4.2 and B.5.2 respectively) until the total price of said items is allotted.

(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 December 15, 2014.

(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 estimate 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.

(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) of this clause. 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.5 NFS 1852.228-76 CROSS-WAIVER OF LIABILITY FOR INTERNATIONAL SPACE STATION ACTIVITIES. (OCT 2012) (Deviation)

(a) The Intergovernmental Agreement 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 cross-waiver of liability in this clause is intended to be broadly construed to achieve this objective.

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

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

(2) “Damage” means:

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

(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” means the intentional ignition of the first-stage motor(s) of the Launch Vehicle intended to place or try to place a Launch Vehicle (which may or may not include any Transfer Vehicle, Payload or crew) from Earth:

(i) in a suborbital trajectory;

(ii) in Earth orbit in outer space; or

(iii) otherwise in outer space,

including activities involved in the preparation of a Launch Vehicle, Transfer Vehicle or Payload for launch.

(4) “Launch Services” means:

(i) Activities involved in the preparation of a Launch Vehicle, Transfer Vehicle, Payload, or crew (including crew training), if any, for launch; and

(ii) The conduct of a Launch.

(5) “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.

(6) “Partner State” includes each Contracting Party for which the 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) 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's Cooperating Agency in the implementation of that MOU.

(7) “Party” means a party to an Agreement involving activities in connection with the ISS, including this contract.

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

(9) “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 performed 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.

(10) "Reentry" means to return or attempt to return, purposefully, a Transfer Vehicle, Payload, or crew from the ISS, Earth orbit, or outer space to Earth.

(11) "Reentry Services" means:

(i) Activities involved in the preparation of a Transfer Vehicle, Payload, or crew (including crew training), if any, for Reentry; and

(ii) The conduct of a Reentry.

(12) "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.

(13) "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-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)(7) of this clause;

(ii) A Partner State, including 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 Related Entities 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 Related Entities 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 Contractor and its own Related Entities or between its Related Entities;

(ii) Claims made by a natural person (with the exception of Passengers and Commercial Cargo Customers as defined in clause H.23 of this contract), 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 or 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.

(vii) Claims against Passengers or Commercial Cargo Customers as defined in clause H.23 of this contract.

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

(d) Waiver of claims Between the Government and Contractor:

(1) This clause provides for a reciprocal waiver of claims between the Government and the Contractor and their Related Entities as described in paragraph (c) above, except that the Government shall waive such claims only to the extent such claims exceed the maximum amount of the Contractor's insurance or financial capability required under paragraph (f) below. This reciprocal waiver of claims shall not apply to rights and obligations arising from the application of any of the other clauses in the contract or to rights and obligations arising from activities that are not within the scope of this contract.

(2) Pursuant to paragraph (c)(2), the Contractor shall extend this waiver of claims to its Related Entities by requiring them, by contract or otherwise, to waive all claims against the Government and its Related Entities. For avoidance of doubt, the Contractor shall require its Passengers and Commercial Cargo Customers, as defined in clause H.23 of this contract, to waive claims against the Government and the Government's Related Entities; however, the Government does not waive such claims against Passengers or Commercial Cargo Customers.

(e) Clause H. 18 of this contract requires the Contractor to obtain a Federal Aviation Administration (FAA) license, in accordance with 51 U.S.C. 50901 *et seq.*, for Launch and Reentry Services performed under CLIN 002 missions. The waivers of claims in this clause H.5 shall apply to CLIN 001 activities. The waivers of claims also shall apply to CLIN 002 activities, except that the waiver of claims between the Government and the Contractor under paragraph (d) shall not be applicable for CLIN 002 Launch Services and Reentry Services that are subject to the FAA license.

(f) The Contractor shall maintain insurance, or demonstrate financial capability to compensate, for damages (as defined in paragraph (b)(2)(ii)) to U.S. Government property, except for: (a) damage to all on orbit ISS structures, modules, and systems required for functionality of the ISS, during Launch Services, Reentry Services, or transportation to, from, in proximity of, or docking with the ISS under this contract; and (b) damage or loss resulting from the willful misconduct of the Government or its employees. For purposes of this paragraph (f), "preparation" of a Launch Vehicle or Transfer Vehicle includes test, assembly, integration or operations of the Launch Vehicle, Transfer Vehicle or their Payloads on a Government installation. Such insurance shall be an amount up to $100 million, or the maximum amount available in the market at reasonable cost, subject to approval by the Contracting Officer. Financial capability, if authorized by the Contracting Officer, shall be in the amount of $100 million. The Contractor shall provide acceptable evidence of the insurance or financial capability to the Contracting Officer, subject to Contracting Officer approval. Insurance policies shall name the United States Government as an

additional insured party. Once approved by the Contracting Officer, insurance policies may not be modified or canceled without the prior, written approval of the Contracting Officer.

(End of Clause)

H.6 NFS 1852.223-74 DRUG- AND ALCOHOL-FREE WORKFORCE (MARCH 1996)

(a) **Definitions.** As used in this clause the terms **"employee," "controlled substance," "employee in a sensitive position,"** and **"use, in violation of applicable law or Federal regulation, of alcohol"** are as defined in 48 CFR 1823.570-2.

(b) (1) The Contractor shall institute and maintain a program for achieving a drug-and alcohol-free workforce. As a minimum, the program shall provide for preemployment, reasonable suspicion, random, post-accident, and periodic recurring (follow-up) testing of Contractor employees in sensitive positions for use, in violation of applicable law or Federal regulation, of alcohol or a controlled substance. The Contractor may establish its testing or rehabilitation program in cooperation with other Contractors or organizations.

(2) This clause neither prohibits nor requires the Contractor to test employees in a foreign country. If the Contractor chooses to conduct such testing, this clause does not authorize the Contractor to violate foreign law in conducting such testing.

(3) The Contractor's program shall test for the use of marijuana and cocaine. The Contractor's program may test for the use of other controlled substances.

(4) The Contractor's program shall conform to the "Mandatory Guidelines for Federal Workplace Drug Testing Programs" published by the Department of Health and Human Services (59 FR 29908, June 9, 1994) and the procedures in 49 CFR part 40, "Procedures for Transportation Workplace Drug Testing Programs," in which references to "DOT" shall be read as "NASA", and the split sample method of collection shall be used.

(c) (1) The Contractor's program shall provide, where appropriate, for the suspension, disqualification, or dismissal of any employee in a sensitive position in any instance where a test conducted and confirmed under the Contractor's program indicates that such individual has used, in violation of applicable law or Federal regulation, alcohol or a controlled substance.

(2) The Contractor's program shall further prohibit any such individual from working in a sensitive position on a NASA contract, unless such individual has completed a program of rehabilitation described in paragraph (d) of this clause.

(3) The Contractor's program shall further prohibit any such individual from working in any sensitive position on a NASA contract if the individual is determined under the Contractor's program to have used, in violation of applicable law or Federal regulation, alcohol or a controlled substance and the individual meets any of the following criteria:

(i) The individual had undertaken or completed a rehabilitation program described in paragraph (d) of this clause prior to such use;

(ii) Following such determination, the individual refuses to undertake such a rehabilitation program;

(iii) Following such determination, the individual fails to complete such a rehabilitation program; or

(iv) The individual used a controlled substance or alcohol while on duty.

(d) The Contractor shall institute and maintain an appropriate rehabilitation program which shall, as a minimum, provide for the identification and opportunity for treatment of employees whose duties include responsibility for safety-sensitive, security, or National security functions who are in need of assistance in resolving problems with the use of alcohol or controlled substances.

(e) The requirements of this clause shall take precedence over any state or local Government laws, rules, regulations, ordinances, standards, or orders that are inconsistent with the requirements of this clause.

(f) For any collective bargaining agreement, the Contractor will negotiate the terms of its program with employee representatives, as appropriate, under labor relations laws or negotiated agreements. Such negotiation, however, cannot change the requirements of this clause. Employees covered under collective bargaining agreements will not be subject to the requirements of this clause until those agreements have been modified, as necessary; provided, however, that if one year after commencement of negotiation the parties have failed to reach agreement, an impasse will be determined to have been reached and the Contractor will unilaterally implement the requirements of this clause.

(g) The Contractor shall insert a clause containing all the terms of this clause, including this paragraph (g), in all subcontracts in which work is performed by an employee in a sensitive position, except subcontracts for commercial items (see FAR Parts 2 and 12).

(End of Clause)

H.7 SPECIAL STUDIES TASK ORDERING PROCEDURES (APPLICABLE TO CLIN 003 ONLY)

If the Government issues a Request for Special Studies Task Order Proposal or a modification to a task order, the Contractor shall utilize the fully burdened labor rates shown in Table B.5.1, *Special Studies Labor Rates*, and other data defined in clause G.9, *Requirements for Data Other than Certified Cost or Pricing Data*, as required per the Contracting Officer, for pricing task orders. The Contracting Officer will use this data to determine if the proposed prices for any task orders are fair and reasonable in accordance with FAR 15.4. The types of data other than certified cost and pricing data that may be required to be included in the proposal associated with these task orders could include:

(a) Prior sales, catalog pricing and discounts.

(b) Other information such as: hours by labor category, historical, current and projected labor hours and rates, prime Contractor and subcontractor cost/price analyses, or historical material (non-labor) purchases.

(c) Additional data not included in (a) or (b) that is considered Other Than Certified Cost or Pricing Data.

(End of Clause)

H.8 POST CERTIFICATION MISSION TASK ORDERING PROCEDURES (APPLICABLE TO CLIN 002)

(a) Requirements for Competition.
In the event that two (2) or more commercial crew transportation contracts are awarded, a fair opportunity to be considered for task orders issued under this contract based upon the specific task order requirements will be provided, unless the Contracting Officer determines that one of the following apply:

(1) The Agency need is of such urgency that competing the requirements among Contractors would result in unacceptable delays;

(2) Only one Contractor is capable of providing the service at the level of quality required because the service ordered is unique or highly specialized;

(3) The order must be issued on a sole-source basis in the interest of economy and efficiency because it is a logical follow-on to an order issued under the contract, provided that all Contractors were given a fair opportunity to be considered for the original order; or

(4) It is necessary to place an order to satisfy the minimum guarantee per clause B.4, *Post Certification Missions (IDIQ) (CLIN 002).*

(b) Task Ordering Information Applicable to Post Certification Mission Task Orders.

(1) Prior to the issuance of a request for proposal applicable to a Post Certification Mission Task Order, exchanges and fact-finding may take place with Contractor(s). The request for a task order proposal will provide any special instructions regarding the level of detail required in the proposal. The request will include a date and time for submission of the proposal. Proposals will be due within thirty (30) calendar days from the date of the proposal request unless stated otherwise.

(2) The Contractor, when submitting a Post Certification Mission Task Order Proposal, shall indicate that the proposal is compliant with the contract terms, statement of work, and the specific requirements contained in the Task Order Request for Proposal, and shall include the following at a minimum:

(i) A **DRD 202 Post Certification Mission (PCM) Work Plan** anchored to the PCM mission launch date and landing date specified by the Government.

(ii) A **DRD 201 Mission Integration and Operations Management Plan (MIOMP)**.

(iii) Any feedback to the NASA proposed mission success criteria and specific percentages of the final payment (reference clause H.21, *Post Certification Mission Success Determination*).

(iv) Any Contractor proposed mission objectives above PCM objectives and manifesting requirements specified by the Government.

(3) Mandatory Proposal Submission.
Unless otherwise agreed to by the Contracting Officer, it is mandatory for contract holders under multiple award to respond to each Request for Post Certification Mission Task Order Proposal provided these requirements are identified in the schedule and do not conflict with the contract ordering limitations.

(4) All competitive Post Certification Mission Task Order Proposals shall be submitted by the date and time specified in the request, or it will be treated as a late proposal in accordance with FAR 52.215-1(C)(3), *Instructions to Offerors – Competitive Acquisition.* The Contracting Officer will evaluate a Task Order proposal per the evaluation criteria stated in the Request for Task Order Proposal. Each Request for Task Order Proposal will use evaluation criteria tailored for the specific mission, but will at a minimum include technical approach and price.

(5) Award of Task Orders.
Each of the Contractors will be notified of NASA's award of a Task Order. Pursuant to FAR 16.505(a)(10), no protest under Subpart 33.1 is authorized in connection with the issuance or proposed issuance of an order under a task-order contract or delivery-order contract, except for—(A) A protest on the grounds that the order increases the scope, period, or maximum value of the contract; or (B) A protest of an order valued in excess of $10 million. Protests of orders in

excess of $10 million may only be filed with the Government Accountability Office, in accordance with the procedures at Subpart 33.104.

Pursuant to FAR 16.505(b)(1)(iv), for task or delivery orders in excess of $5 million, the requirement to provide all awardees a fair opportunity to be considered for each order shall include an opportunity for a post-award debriefing in accordance with FAR 16.505(b)(6).

(End of Clause)

H.9 REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFEROR

The completed provision FAR 52.204-8, *Annual Representations and Certifications*, including any amended representation(s) made at paragraph (b) of the provision; and other representations, certifications and other statements contained in Section K completed and submitted as part of the offer dated July 7, 2014, are hereby incorporated by reference in this resulting contract.

(End of Clause)

H.10 [RESERVED]

H.11 UNITED STATES COMMERCIAL PROVIDER AND DOMESTIC SOURCE CRITERIA

The Contractor shall perform as a United States Commercial Provider per paragraph (a) and meet the domestic source criteria per paragraph (b). Failure to comply with these criteria during the performance of this contract may be grounds for termination in accordance with the Default clauses in I.2.

(a) "United States commercial provider" means a commercial provider, organized under the laws of the United States or of a State, which is—

(1) more than 50 percent owned by United States nationals; or

(2) a subsidiary of a foreign company and the Secretary of Transportation finds that—

(i) such subsidiary has in the past evidenced a substantial commitment to the United States market through—

(A) investments in the United States in long-term research, development, and manufacturing (including the manufacture of major components and subassemblies); and

(B) significant contributions to employment in the United States; and

(ii) the country or countries in which such foreign company is incorporated or organized, and, if appropriate, in which it principally conducts its business, affords reciprocal treatment to companies described in subparagraph (a)(1) comparable to that afforded to such foreign company's subsidiary in the United States, as evidenced by—

(A) providing comparable opportunities for companies described in subparagraph (a)(1) to participate in Government sponsored research and development similar to that authorized under this Act;

(B) providing no barriers, to companies described in subparagraph (a)(1) with respect to local investment opportunities, that are not provided to foreign companies in the United States; and

(C) providing adequate and effective protection for the intellectual property rights of companies described in subparagraph (a)(1).

(b) The Contractor shall produce in performance of this contract a Crew Transportation System (CTS) that is a domestic end product. The CTS intended for this contract, as carried through production for the provision of service missions, shall be a domestic end product only if the cost of its components, mined, produced or manufactured in the United States exceeds 50 percent of the cost of all its components. The cost of each component includes transportation costs to the place of incorporation into the CTS and any applicable duty (whether or not a duty-free entry certificate is issued). "Components" as used in this clause, means those articles, materials and supplies directly incorporated into the design of the end product.

(End of Clause)

H.12 GOVERNMENT FURNISHED SERVICES AND DATA

The Government will furnish the following services and data to the Contractor on a no-charge-for-use basis to the extent reasonably necessary for the Contractor to fulfill its contractual obligations:

(a) The Government will provide Tracking and Data Relay Satellite System (TDRSS) and NASA Integrated Services Network (NISN) support over existing assets for tracking and recovery during the performance of flight tests and Post Certification Missions. The Contractor shall optimize the use of TDRSS and limit the Single Access (SA) to critical operations such as system check-out, critical maneuvers, and proximity rendezvous operations. The Contractor shall identify, with reasonable notice, their request for this service with rationale describing the required usage within their mission profile. Standard routing of data will be at NASA's discretion depending on the location of the customer control center in order to achieve the most efficient and cost effective routing.

(b) The Government will make available the NASA Docking System (NDS) data per the schedule below:

(1) The preliminary build-to-print package will be available by November 2014.

(2) The final build-to-print package will be available by June 2016.

(3) The Mass Simulator build-to-print will be available by August 2014.

(End of Clause)

H.13 REMOTELY SENSED DATA

The Contractor consents to the U.S. Government collecting remotely sensed data related to its CTS vehicles and to use such data for U.S. Government purposes. The remotely sensed data may be used, modified, reproduced, released, performed, displayed, or disclosed within the Government under suitable protective conditions. The Government may not, without written permission, of the Contractor, release or disclose the data outside the Government, except as otherwise required by law, use the technical data for manufacture, or authorize the technical data to be used by a party outside the Government. The remotely sensed data may be shared with, released to, or otherwise disclosed to the Contractor.

(End of Clause)

H.14 USE OF GOVERNMENT PROPERTY, FACILITIES, ASSETS, OR SERVICES

This clause applies to any Government support, including property, facilities, assets, or services, not otherwise provided for under this contract whether obtained from NASA or another Government Agency.

(a) Support obtained from a Government Agency other than NASA.

(1) 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 Representative (COR), or designee, of any contracts or agreements between the Contractor and any Government Agency under this paragraph (a).

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

(b) Support obtained from a NASA Center or Component Facility.

(1) Except as may be expressly stated in this contract as furnished by the Government, the Contractor shall obtain use of any Government property, facilities, assets or services available from a NASA Center or Component Facility (a "Performing Organization") for performance of this contract through the use of an appropriate Task Plan. For Task Plan reference instructions, the Contractor shall contact the Performing Organization Point of Contact (POC). The Contractor shall be responsible for obtaining, negotiating and documenting all Task Plans with the Performing Organization. The Contractor shall be responsible for any costs associated with property, facilities, assets, or services provided by a Performing Organization under a Task Plan and such costs shall result in no increase in the price of this contract. The Contractor shall notify the Contracting Officer Representative (COR), or designee, of any Task Plans between the Contractor and a Performing Organization under this paragraph (b).

(2) NASA makes no warranty whatsoever as to the availability or suitability for use of property, facilities, assets, or services made available by a Performing Organization under a Task Plan. The Contractor assumes all responsibility for determining the suitability for use of all such property, facilities, assets, or services, including technical suitability, schedule availability and cost. The Contractor further acknowledges and agrees that any use of Government property, facilities, assets, or services under a Task Plan shall not relieve the Contractor of full performance responsibility under the contract.

(3) Any implementation issues or disputes arising under a Task Plan shall be referred for resolution to the Points of Contact, or if necessary the signatories, identified in the Task Plan.

(End of Clause)

H.15 GOVERNMENT INSIGHT

(a) Introduction

(1) Government insight provides NASA Commercial Crew Program (CCP) and ISS Program Management an understanding of the Contractor's activities to assess the status, critical paths, and risk associated with successfully completing contract requirements, achieving final certification, and successfully completing Post Certification Missions. Government insight will include: Insight, Quality Assurance function, and Joint Test Team (JTT) participation as defined below.

(2) Government 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 for the eventual certification approval.

(i) This clause 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.

(ii) The Government reserves the right to implement remedies for nonconforming services or work. These remedies are described in clause E.2 52.246-4 *Inspection of Services and Research and Development Work - Fixed-Price (Deviation)*.

(3) The Contractor shall ensure the Government has insight, into all subcontractors and suppliers performing or supporting any critical work associated with this contract.

(4) Details of the Contractor's approach to insight to accomplish items (a)(1), (a)(2) and (a)(3) above shall be implemented in accordance with **DRD 001 Insight Implementation Plan.**

(b) Notification

The Contractor shall notify the Commercial Crew Program designee of technical meetings, control boards, reviews, tests, and areas identified for Government Quality Assurance associated with certification and Post Certification Mission activities in the mutually agreed timeframe to permit meaningful Government participation through the entire event, in accordance with **DRD 001 Insight Implementation Plan**.

(c) Access

(1) The Contractor shall provide the Government and its support services contractor(s), under suitable protective conditions, access to all Contractor activities associated with certification and Post Certification Mission activities under this contract. Activities include, but are not limited to CCT-PLN-1100, *Crew Transportation Plan,* Appendix C, *Insight Areas*.

(2) The Contractor shall provide the Government and its support services contractor access to all data used in performance of this contract, including but not limited to, data associated with areas of insight identified in CCT-PLN-1100 Appendix C and supporting data/information, and

administrative and management information with the exception of financial information; and any other information, not used in performance of the contract, related to the Crew Transportation System (CTS) design, production, and operations to include technical data, supporting data/information, and administrative and management information with the exception of financial information.

(3) At a minimum, access to data is the ability for Government and its support services contractor personnel, both remotely and on-site at the Contractor's facilities, to locate and review all data (as defined in (4) directly below) in a useable and readable format.

(4) The Government may use the data to which it has access under this provision solely for the purposes specified in paragraph (a)(1).

(5) The Contractor shall provide office space co-located on-site, badging, furniture, telephones, and use of easily accessible fax, data lines, and copy machines, for full-time and temporary Government personnel and its support services contractor performing insight activities, in accordance with **DRD 001 Insight Implementation Plan**.

(d) Joint Test Team Activities

(1) The JTT-related activities will be Contractor-led (reference CCT-PLN-1120, *Crew Transportation Technical Processes,* Section 5.3, *Flight Test*), and shall include active and steady state Government participation both on site and remotely. The Contractor shall accommodate Government personnel who will provide embedded insight during the activities identified in (d)(2). Government JTT members will not provide direction to Contractor personnel on design changes or procedures, or any other aspect of CTS development, production, or operation. Government JTT members provide insight only, and will not approve or disapprove any aspect of the Contractor's CTS design or performance of the contract. Any action(s) taken by the Contractor in response to any direction given by any person other than the Contracting Officer shall be at the Contractor's risk. The JTT will provide a formal, unambiguous, programmatic structure for Government operationally focused input to the Contractor. In addition, the Government lead on the JTT will provide integrated, consolidated operations insight to the CCP. By its structure, the JTT will prevent unintended, informal Government inputs to the Contractor. To the maximum extent possible, the JTT will work together and strive to resolve operational issues at the lowest level.

(2) The Government's JTT insight activities will focus on qualitative assessments of crew operational interfaces with the vehicle and human-in-the-loop assessments of operational suitability. These assessments will include, but are not limited to vehicle handling qualities, situational awareness, workload and operational complexity, usability, cockpit layout, displays and controls, and flight crew suits. In addition, insight will occur through participation during the planning and build up phase of ground testing (e.g., simulator training and evaluations, mockup demonstrations, etc.), during test flights, and during the post-test flight evaluation process. Insight gained through integrated operations assessments will ultimately feed into NASA's verification approval decisions (before test flight) and validation approval decisions (post test flight).

(e) Government Quality Assurance (GQA) Functions

(1) The Government will perform the following quality assurance functions: Product Examination, Process Witnessing, Record Review, Surveillance, and Audit.

(2) GQA functions will be performed for all safety-critical items/processes/products identified by a risk based analysis (RBA). A RBA 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, by providing technical expertise, as required. The definition of safety critical is found in CCT-REQ-1130, *ISS Crew Transportation and Services Requirements Document*, and SSP 50808, *ISS to Commercial Orbital Transportation Services (COTS) Interface Requirements Document (IRD)*.

(f) Result of Insight

(1) Insight should result in an effective working relationship between the Government and the Contractor leading to a NASA certification of the Contractor's CTS. Should insight and/or JTT participation identify non-compliance with CCT-REQ-1130, CCT-PLN-1120, and/or SSP 50808; the terms and conditions of the contract; or a difference in interpretation of test results; or disagreement with the Contractor's technical approach; the Government insight team will elevate the issue through the appropriate CCP boards. Through an effective, functioning relationship, the Government and Contractor should strive to resolve issues at the lowest working level and minimize issues elevated to program boards. Program boards will disposition recommendations in a timely manner and provide oversight resolution if necessary. Resulting board decisions and direction will be transmitted to the Contractor through the Contracting Officer. If disposition results in a requirement change, the change clause (I.2, FAR 52.243-1, *Changes-Fixed Price*) would take effect. If the Contractor and Contracting Officer disagree on whether the board disposition provided is within the requirements of the contract, the disputes clause (I.2, FAR 52-233-1, *Disputes-Alternate I*) is applicable.

(2) The data generated as a result of Government insight may be used, modified, reproduced, released, performed, displayed, or disclosed within the Government and its support service contractors under suitable protected conditions. The Government may not, without written permission of the Contractor, release or disclose the data outside the Government, except as otherwise required by law, use the technical data for manufacture, or authorize the technical data to be used by a party outside the Government.

(g) Contractor Responsibility

Notwithstanding the insight set forth in this Clause, the Contractor assumes full performance responsibility as set forth in this contract. The Government's insight or JTT participation under his clause shall not be construed as authorization, endorsement or approval of milestones, certification or final acceptance or rejection of Post Certification Mission success.

(End of Clause)

H.16 NEW ENTRANT

(a) The purpose of this clause is to notify the Contractor that NASA may conduct a subsequent competition due to the loss of an existing CTS provider or if there are additional future NASA requirements for certified crew transportation. NASA will determine if these conditions are met prior to synopsizing and conducting a New Entrant competition. New entrants may compete for all task orders under this contract.

(b) The Government reserves the right to issue a solicitation in the future to seek an additional source(s) for the same or similar efforts/services.

(End of Clause)

H.17 PUBLIC AFFAIRS

(a) It is anticipated that the Contractor will execute media events to cover major contract activities. The Contractor may, consistent with Federal law and this Contract, release general information regarding its activities conducted within the scope of the Contract:

(1) The Contractor will coordinate with the NASA Public Affairs Office (PAO) at Kennedy Space Center in a timely manner prior to major media releases, media interviews, news conferences, contingency statements, media scouts, photo opportunities and film crew activities regarding NASA CCtCap-related efforts.

(2) The use of any direct quote by a NASA official shall be submitted for NASA concurrence to ensure accuracy prior to its release.

(3) NASA will coordinate, with the Contractor, public releases of information to obtain comments and technical corrections related to the Contractor's CCtCap-related efforts prior to NASA's release of information to the public. The Contractor shall use its best efforts to provide its review and comments back to NASA within five (5) days of the request. If comments are not provided within the five (5) day time period, the submitted content will be considered acceptable for release. For breaking news items, there may be a need for more timely release of information to the public in which case the Government PAO team will coordinate with the Contractor for imminent release.

(4) The Contractor shall assist the NASA PAO in developing the mission commentary for NASA Television by furnishing CTS background material.

(5) The Contractor may also be requested to provide information to support the development of press kit documents and NASA news conferences.

(6) At a minimum of forty-five (45) days in advance, the Contractor shall work with the COR to coordinate any public affairs requirements for any launches, landings, major milestones and tests under this contract.

(7) If the Contractor has knowledge that the press is inquiring about an event that meets criteria in paragraph (b) of clause H.26, *Mishap Reporting*, the Contractor shall promptly notify the Contracting Officer, or designee, of the event. The Contracting Officer, or designee, will facilitate access to NASA Public Affairs. NASA Public Affairs will work with the Contractor to generate a coordinated response to the Press and the public.

(b) The Contractor shall protect NASA crew member's audio and imagery for all contract activities in accordance with SSP 50521, *Return, Processing, Distribution and Archiving of Imagery Products from the ISS*, to protect NASA crew member privacy. For downlinked audio and imagery, the Contractor shall route the data in real-time to the NASA Mission Control Center. NASA will monitor feed(s) and instruct the Contractor to remove the feed-from release to the public in the event of a privacy concern. For imagery and audio recorded during flight operations and recovered post-flight, the Contractor shall send a copy of the data to NASA for review. The Contractor shall not release any video and/or audio with NASA crew members in view until the NASA review is complete. NASA will inform the Contractor if any data is restricted. Restricted data cannot be released by the Contractor, either internally or externally, or used in any way. Data that does not contain NASA crew members may be used by the Contractor after proper coordination in accordance with paragraph (a) above.

(c) The Contractor shall not use the words "National Aeronautics and Space Administration" or the letters "NASA" in connection with a product or service in a manner reasonably calculated to convey any impression that such product or service has the authorization, support, sponsorship, or endorsement of NASA, which does not, in fact, exist. In addition, the Contractor shall submit in advance any proposed public use of the NASA name or initials for NASA review and approval. NASA approval shall be based on applicable law and policy governing the use of the NASA name and initials. NASA's approval will not be unreasonably withheld. Use of NASA emblems/devices (i.e., NASA Seal, NASA Insignia, NASA logotype, NASA Program Identifiers, and the NASA Flag) is governed by 14 C.F.R. Part 1221. The Contractor shall not publicly use such emblems/devices without prior NASA review and approval in accordance with such regulations.

(d) NASA does not endorse or sponsor any commercial product, service, or activity. NASA's certification of the CTS under this Contract does not constitute certification or endorsement by NASA that the CTS is safe for public transportation of humans to Low Earth Orbit. NASA's CTS certification means the Contractor's CTS has met NASA's safety requirements for transporting NASA or NASA-sponsored crew to the ISS. The Contractor agrees that nothing in this Contract will be construed to imply that NASA authorizes supports, endorses, or sponsors any product or service of the Contractor resulting from activities conducted under this Contract.

(End of Clause)

H.18 LICENSES, PERMITS, AND OTHER AUTHORIZATIONS FOR A LAUNCH OR REENTRY SERVICE OPERATOR

The Contractor shall obtain and maintain the necessary licenses, permits and clearances that may be required by the Department of Transportation, Department of Commerce, Department of Defense, NASA, or other Governmental agencies in order to provide flight tests and Post Certification Missions under this contract. The Contractor shall obtain a Federal Aviation Administration license, in accordance with 51 U.S.C. Section 50901 *et seq.*, for launch and reentry operations performed under CLIN 002, *Post Certification Missions (PCM),* of this contract. All costs and fees associated with obtaining licenses, permits and clearances are included in the standard prices identified for CLIN 001, *DDTE/Certification,* in Table B.3, *DDTE/Certification SubCLINs (CLIN 001),* and for CLIN 002 in Table B.4.1, *Post Certification Mission Prices (CLIN 002).*

The Contractor shall meet all contract requirements, in addition to all requirements necessary to obtain and maintain licenses, permits and clearances. In the event conflicts arise, the Contractor is responsible for resolving the conflict and shall immediately notify the Contracting Officer of the conflict and shall describe the methods the Contractor used to try to resolve the conflict.

(End of Clause)

H.19 POST CERTIFICATION MISSION PAYMENTS, MILESTONES AND AUTHORITY TO PROCEED (ATP) CRITERIA

(a) Post Certification Mission (PCM) task orders may be awarded prior to completion of CLIN 001, *DDTE/Certification.* However, the Contractor shall meet the following development-related criteria before NASA will grant Authority to Proceed (ATP) with such missions. ATP for PCMs is at NASA's sole discretion and is dependent on meeting the criteria. Specific mission objectives and target launch date are provided by NASA.

Table H.19.1: ATP Criteria

Post Certification Mission Number	ATP Criteria
[redacted]	[redacted]
[redacted]	
[redacted]	

The following constraints apply to ATP criteria:

(1) A maximum of two (2) PCMs can be ordered prior to completion of the ISS Design Certification Review (ISS DCR).

(2) Prior to the first PCM ATP, the Certification Baseline Review (CBR) and one or more interim milestones, from Attachment J-03, Appendix A, *Milestone Acceptance Criteria and Payment Schedule,* representing work culminating in a significant design review between CBR and the first DCR must be successfully completed. These interim milestones ensure the detailed design will satisfy the requirements with adequate margins, are sufficiently mature to proceed with fabrication, assembly, integration, and test, and the product verification and product validation plans are complete.

(b) Post certification mission payments will be based upon successful completion of approved milestone schedule and acceptance criteria defined in the Contract PWS and developed per the **DRD 202 Post Certification Mission (PCM) Work Plan**. NASA has up to thirty (30) calendar days to determine whether the performance of the Mission Milestone Review (per Table H.19.2, *Mission Milestone Review Payment Schedule*) satisfies the approved criteria.

(c) All Post Certification Mission milestone payments are performance-based interim financing payments made in accordance with FAR 52.232-32, *Performance Based Payments.* Milestone payments once made are subject to repayment by the Contractor if the conditions defined in FAR 52.232-32 (j), *Special terms regarding default,* apply.

(d) Table H.19.2 identifies the Mission Milestone Reviews required under the contract which are to be included by the Contractor in the **DRD 202 Post Certification Mission Work Plan**.

Table H.19.2: Mission Milestone Review Payment Schedule

Mission Level Milestone	Mission Milestone Reviews	Amount (% of Standard Mission Price) PCM 1	Amount (% of Standard Mission Price) PCM 2 and subsequent missions
[redacted]			

(e) PCM task order payment constraints: The total PCM task order payments made prior to and including:

(1) The completion of the SubCLIN 001A, *ISS Design Certification Review (ISS DCR),* (associated with the required crewed flight test to ISS; see Attachment J-03, Appendix A) shall not exceed 20% of the total price of the mission.

(2) The completion of the Vehicle Baseline Review (VBR) shall not exceed 30% of the total price of the mission.

(3) The completion of the Mission Integration Review (MIR) shall not exceed 50% of the total price of the mission.

(4) The completion of the SubCLIN 001B, *Certification Review (CR),* (see Attachment J-03, Appendix A) shall not exceed 60% of the total price of the mission.

(5) The completion of the NASA Flight Readiness Review (FRR) shall not exceed 75% of the total price of the mission.

(6) The final milestone payment must equal at least 10% of the price of the mission.

(f) Payment schedules may be deferred or canceled by NASA if the Contractor fails to make substantial progress in accomplishing DDTE/Certification and Post Certification Mission major milestone events.

(g) In the event of a mission schedule adjustment by NASA or Contractor in accordance with clause H.20, *Adjustments to Post Certification Mission Schedule,* the payment schedule for the applicable mission shall be postponed for the length of the delay, if necessary, to correspond with the new delivery date and the milestone events in the **DRD 202 Post Certification Mission (PCM) Work Plan**. The requirement to make substantial progress in general conformance with the Post Certification Mission Work Plan, however, is not waived for any postponement of the mission.

(End of Clause)

H.20 ADJUSTMENTS TO POST CERTIFICATION MISSION SCHEDULE

(a) This clause covers launch delays at the convenience of NASA and the Contractor. The provisions of this clause do not apply to circumstances arising under clause H.23 (d), *Non-NASA Passengers, Cargo and Payloads,* related to requested delays to accommodate Contractor's passengers or non-NASA cargo or payloads.

(b) Task orders issued to Contractors are intended to require Post Certification Missions to ISS with limited flexibility to adjust launch dates. To provide flexibility to both the Contractor and NASA, a standard launch window will be established for each planned Post Certification Mission. Authorization to Proceed (ATP) is formal written direction from the Contracting Officer that authorizes the Contractor to proceed with the work detailed within a **DRD 202 Post Certification Mission Work Plan**. The standard launch window will be created by NASA establishing an initial window for each mission at ATP. Thereafter, with mutual agreement between the Contractor and NASA, the launch window will be reduced according to the table below.

Table H.20.1: Launch Windows for PCM ATP Prior to ISS DCR*

Months Prior to Launch Date – First Day to Last Day	**Standard Launch Window (Days)**
ATP through L-13m	90d
L-13m through L-4m	30d
L-4m through Launch	7d

Table H.20.2: Launch Windows for PCM ATP After ISS DCR*

Months Prior to Launch Date – First Day to Last Day	**Standard Launch Window (Days)**
ATP through L-13m	30d
L-13m through Launch	7d

*ISS DCR is the DCR for the crewed flight to ISS

(c) At each major review referenced in Table H.19.2, *Mission Milestone Review Payment Schedule*, NASA and the Contractor shall review the window established and mutually agree on the next reduced launch window corresponding to the Tables H.20.1 and H.20.2.

(d) For PCM(s) ordered prior to completion of SubCLIN 001A, *ISS DCR*, Table H.20.1, *Launch Windows for PCM ATP Prior to ISS DCR*, each party, NASA or Contractor, may request a cumulative maximum delay of thirty (30) calendar days per mission regardless of fault without a change in the fixed price of the mission.

(e) If either NASA or Contractor desires a change to the launch date, NASA or the Contractor will give written notice of the desired change. Any request for changes to the launch date should be submitted within twenty-four (24) hours of identifying the need to request a change in the launch date. For any request for changes to launch date submitted greater than one month prior to launch, NASA and the Contractor shall reach mutual agreement on a new launch date within fourteen (14) days of the request. Any requests for changes to the launch date submitted between one (1) month prior to launch and launch day shall be a priority and resolved as soon as possible.

If mutual agreement on the revised launch date cannot be reached, the Contracting Officer shall have the right to unilaterally establish a new schedule.

(f) In the event of a NASA- or Contractor-requested delay of the launch window beyond the days allowable in Table H.20.1 and paragraph (d) or Table H.20.2, *Launch Windows for PCM ATP After ISS DCR*, the Contracting Officer shall direct the Contractor, in writing, of the revised launch window. For a NASA requested delay, the Government will allow the Contractor to submit a proposal for the effect of any delay beyond the days allowable on the task order price of all affected PCMs, launch schedule, or other terms of the contract except for conditions defined in clause H.23, *Commercial Passengers, Cargo, and Payloads*. For a Contractor requested delay, NASA reserves the right to seek an equitable adjustment. Upon failure to agree to an adjustment, the Contracting Officer shall have the right to unilaterally adjust the task order.

(g) There will be no basis for an equitable adjustment when the delay in delivery or performance arises solely out of causes beyond the control of NASA or Contractor and not due to the fault or negligence of NASA or Contractor. Such causes include, but are not limited to the following:

(1) Delays resulting from:
- Range Mission Rules and Range Launch Requirements (Mandatory and Required Assets),
- acts of God,
- acts (including delay or failure to act) of any Governmental authority (De Jure or De Facto),
- wars (declared or undeclared),
- riots,
- revolution,
- hijacking,
- fires,
- freight embargoes,
- sabotage,
- epidemics,
- strikes and
- interruptions of essential services such as electricity, natural gases, fuels and water,

(2) or any condition which jeopardizes the safety of the employees of the Contractor, NASA, or its subcontractors;

(3) or a CTS failure investigation, provided NASA retains its original position in the order of the queue sequence and that all data related to the failure investigation is made available to NASA without restriction.

(End of Clause)

H.21 POST CERTIFICATION MISSION SUCCESS DETERMINATION

(a) Mission Success Criteria

(1) The Mission Success criteria will be defined on a per mission basis and agreed to by NASA and the Contractor during the Task Ordering process.

(2) NASA will provide the initial mission success criteria and specific percentages of the final payment earned for mission performance during the Task Ordering process. The final payment is defined in clause H.19, *Post Certification Mission Payments, Milestones and ATP Criteria*. Any revision to the criteria and payment percentage shall be agreed to at the Mission Certification Review (MCR). In the event that an agreement cannot be reached, the Contracting Officer will establish the criteria and payment percentage by the Flight Readiness Review. The revised criteria will be incorporated into a Task Order revision. The MCR shall include Contractor plans for providing data to confirm mission success as part of the post flight report.

(3) Mission Success Criteria will be established per the following guidelines:

(i) Criteria will consider the Contractor's mission capabilities.

(ii) Criteria will consider the Contractor's performance, independent of NASA's.

(iii) Criteria will consider ascent aborts or earlier than pre-launch planned End-Of-Mission timeframe, contingency spacecraft crew support, and inability to dock with the ISS.

(4) Definitions.

(i) Full Mission Success - meeting all primary objectives and secondary objectives;

(ii) Mission Failure – loss of one or more primary objectives, serious injury or fatality as defined in H.26, *Mishap Reporting*, or damage to the ISS;

(iii) Partial mission success – all primary mission objectives satisfied but loss of one or more secondary mission objectives.

(b) Mission Success Determination

(1) Mission Success Determination will be made using the mission success criteria and the corresponding data and parameters that are jointly agreed to by NASA and the Contractor.

(2) The Contractor shall submit the relevant data and parameters that provide the most accurate information on performance of the mission success criteria, at the Mission Integration Review (MIR). The types of data NASA would consider as relevant information include:

(i) Vehicle data that represents critical systems for all flight phases (such as ascent, approach, docking, mating, and entry).

(ii) Available launch and orbital vehicle data verifying **DRD 203 Vehicle Interface Definition Document (IDD)** environments.

(iii) Closeout photos both on the ground and on orbit documenting CTS configuration at launch and prior to landing per **DRD 214 Imagery and Associated Cataloging**.

(iv) Any supplemental data that may support the Contractor's performance.

(3) If there is data that the Contractor requests NASA to provide (on orbit attached telemetry, on orbit photos, etc.), the Contractor shall identify that prior to the MCR.

(c) Procedures

(1) The Contracting Officer determines unilaterally whether a mission is considered a Mission Success, Partial Mission Success, or a Failed Mission. For partial mission success, the percentage of the final payment earned is based on the agreed to mission success criteria defined in section (a)(2) of this clause. Within fifteen (15) calendar days from receipt of the preliminary **DRD 209 Post-Flight Assessment Report**, the Contracting Officer will either make the Mission Success determination or inform the Contractor of NASA's intent to partially withhold final payment in the event of Partial Mission success, or withhold final payment in the event of a Failed Mission. In the event of a failed mission determination, an additional 15% of the Post Certification Mission (PCM) price shall be applied as a credit to another PCM, other in-kind considerations determined by the parties, or be returned to the Government if it cannot be applied to a subsequent PCM at the Government's discretion. In the event of a Partial Mission Success or a Failed Mission determination, the rights and remedies contained in this Clause are in lieu of any rights and remedies in case of default applicable to this PCM only, including the rights and remedies in clause 52.249-8 *Default* (*Fixed-Price Supply and Service*) and clause E.2, *Inspection of Services and Research and Development Work - Fixed-Price (Aug 1996) (Proposed Deviation)*, paragraphs (g) and (h); FAR 52.232-32 (j) *Special terms regarding default*, and; NFS 1852.223-75 *Major Breach of Safety or Security* For all other activities under the contract not part of this PCM task order, the Government reserves the right to terminate the contract for default in accordance with FAR 52.249-8 *Default* (*Fixed-Price Supply and Service*). Remedies described in this paragraph are available at Launch. Launch is defined as the intentional ignition of the first-stage motor(s) of the launch vehicle intended to place or try to place a launch vehicle (which may or may not include any payload or crew) from Earth:

(i) in a suborbital trajectory;

(ii) in Earth orbit in outer space;

(iii) or otherwise in outer space.

(2) If NASA informs the Contractor it will partially withhold or withhold the final payment, NASA will utilize the final **DRD 209 Post-Flight Assessment** and findings from the Contractor's investigation board to complete the NASA assessment. The Contracting Officer shall submit a final determination of either Partial Mission Success or Failed Mission within one (1) week of the NASA assessment. Any stop work order issued during a Mishap Investigation Board (MIB) or similar Partial Mission Success/Failed Mission investigation shall not be subject to an equitable adjustment by either party as provided for under clause H.20(g).

(d) Final Payment for Final Mission Success Determination
The amount of final payment will be based on mission success determination per the agreed criteria and percentage of final payment.

(e) Acceptance
Final acceptance for any unsuccessful mission objectives of the crew transportation service will be accomplished following the Contracting Officer's mission success determination. The Contracting Officer will notify the Contractor in writing of both Mission Success Determination and Acceptance.

(End of Clause)

H.22 LIABILITY FOR THIRD PARTY CLAIMS

This contract clause applies to Third Party claims that arise out of the conduct of hazardous launch, on-orbit, reentry, landing, recovery, and rescue activities under this contract which are not subject to an FAA license pursuant to 51 U.S.C. Section 50901 *et seq*.. More specifically, this contract clause allocates between the Government and the Contractor the risk of Third Party claims for damage to or loss of property or personal injury or death arising from the burning, explosion, detonation, combustion or impact of a launch vehicle, its payloads, spacecraft, or any components thereof, from the time of preparation of a launch vehicle until landing and recovery.

(a) *Definitions.*

(1) Covered Activities: Any and all Hazardous Activities involved in the preparation of a launch vehicle for launch and conduct of the launch, when those activities take place at a launch site in the United States; any and all Hazardous Activities involved in on-orbit operations during transportation to, from or in proximity with the International Space Station (ISS); any and all Hazardous Activities involved in reentry of the spacecraft into the Earth's atmosphere; any and all Hazardous Activities involved in landing and recovery of the crew and spacecraft; and any and all Hazardous Activities involved in rescue operations.

(2) Damages:

(i) Bodily injury or death; or

(ii) Damage to or loss of any real or personal property;

(3) Hazardous Activities: any operation or other work activity that, without implementation of proper mitigations, has a high potential to result in loss of life, serious injury to personnel or public, or damage to property due to the burning, explosion, detonation, combustion or impact of a launch vehicle, its payloads, spacecraft, or any components thereof, from the time of launch until landing and recovery, or during rescue operations.

(4) Launch: The intentional ignition of the first-stage motor(s) of the launch vehicle intended to place or try to place a launch vehicle (which may or may not include any payload or crew) from Earth:

(i) in a suborbital trajectory;

(ii) in Earth orbit in outer space; or

(iii) otherwise in outer space.

(5) Launch Vehicle: a vehicle built to place a payload or human beings in outer space.

(6) Party or Parties: The Contractor or NASA, or both.

(7) Payload: All equipment that has been or will be integrated with the launch vehicle for transportation into Earth orbit or escape trajectories.

(8) Preparation of a Launch Vehicle: begins with the arrival of a launch vehicle or payload at a U.S. launch site, and entails critical steps preparatory to initiating launch.

(9) Reentry: The return or attempt to return a spacecraft and its payload and crew, if any, from Earth orbit or from outer space to Earth.

(10) Related Party:

(i) Any of the Parties' directors, officers, agents, or employees

(ii) Any of the Parties' Contractors, subcontractors, or suppliers at any tier involved directly or indirectly in the performance of this Contract

(iii) Any entity having any right, title or interest, whether through sale, lease or service arrangement or otherwise, directly or indirectly, in the payload, the launch vehicle, the spacecraft, or services related to launch, mission, landing, recovery or rescue operations.

A Related Party does not include Passengers and Commercial Cargo Customers, as defined in clause H.23 of this contract.

(11) Spacecraft: A vehicle built to operate in outer space which transports or plans to transport payloads or human beings to/from Earth orbit or escape trajectories.

(12) Third Party: Any person or entity other than the Government, the Contractor and Related Parties, but not including Passengers or Commercial Cargo Customers, as defined in clause H.23 of this contract.

(b) Required Insurance or Demonstration of Financial Capability for Liability to Third Parties

(1) The Contractor shall continue in effect or acquire insurance, or demonstrate financial capability to compensate, for claims by Third Parties for Damages arising in connection with the Covered Activities under this contract. The amount of the insurance or financial capability shall be the maximum amount available in the commercial marketplace at reasonable cost, but shall not exceed $500 million for each test flight or mission, subject to approval by the Contracting Officer.

(2) The Contractor shall provide acceptable evidence to the Contracting Officer of required insurance or financial capability no later than thirty (30) days prior to the beginning of the covered activities. The amount of required insurance or financial capability, and the terms and conditions for the insurance or financial capability, shall be subject to approval by the Contracting Officer. Once approved, insurance policies and terms and conditions for maintaining financial capability may not be modified or canceled without the prior, written approval of the Contracting Officer.

(3) Insurance policies shall name the United States Government and the Related Parties as additional insured parties. Insurance policies shall attach no later than the arrival of the launch vehicle at the launch site and shall remain in force for preparation of a launch vehicle until thirty (30) days after landing and recovery.

(4) The foregoing requirement does not preclude the Contractor from acquiring or continuing in effect any additional insurance to protect the interests of the Contractor, its Related Parties or customers.

(c) Third Party Claims in Excess of Required Insurance or Demonstrated Financial Capability

(1) NASA has determined that activities under this contract are conducted in performance of its functions, as specified in 51 U.S.C. Section 20112(a). As a result, once the Contractor or its insurers have paid out for Third Party claims up to the amount of insurance or financial capability under paragraph (b), NASA will consider any additional Third Party claims for Damages arising from Covered Activities in performance of this contract as claims against the United States under the authority of 51 U.S.C. Section 20113(m). Such claims must be presented to NASA within two (2) years after the incident out of which the claim arises.

(2) The Contractor or its insurers shall adjust, settle and pay meritorious and reasonable Third Party claims against the Contractor and its Related Parties for Damages arising from Covered Activities in performance of this contract up to the amount of insurance or financial capability required in paragraph (b). If a Third Party claim (or multiple Third Party claims resulting from a single event) exceeds the amount of insurance or financial capability required in paragraph (b), the Contractor shall provide timely written notification along with all documentation of the Third Party claim(s) to the Contracting Officer. To the extent NASA determines that such Third Party claim(s) is meritorious, reasonable, and the cumulative costs of

all such claims arising from a single incident is $25,000 or less, NASA shall reimburse the Contractor. To the extent NASA determines that such Third Party claim(s) is meritorious, reasonable, and the cumulative cost of all such claims arising from a single incident exceeds $25,000, NASA will forward the claim(s) to the Secretary of Treasury for certification and payment pursuant to 31 U.S.C. § 1304(a). The costs of the Third Party claim(s) are subject to the availability of funds and the usual tests for allowability. The total of costs to pay for Third Party claims resulting from a single event may be paid up to a limit of $1.5 billion (plus additional amounts necessary to reflect inflation occurring after January 1, 1989) above the payments made by the Contractor or its insurers for such claims. Payment(s) for a claim or cumulative claims arising from a single event the sum total of which exceed the Contractor's insurance or financial capability amount, may be made only if the Contractor has provided notice to the Government with the opportunity to participate or assist in the defense of the claim(s) or action. The NASA Administrator must approve any part of a settlement to be paid out of appropriations of the Government.

(3) In evaluating Third Party claims paid by the Contractor under this clause, NASA will consider such a claim to be meritorious unless the claim represents:

(i) Liabilities for which the Contractor is otherwise responsible under the express terms or conditions of the contract or a task order issued under this contract;

(ii) Liabilities for which the Contractor has failed to insure or has failed to maintain insurance or financial capability as required by the Contracting Officer;

(iii) Liabilities for which the Contractor has not reasonably adjusted, settled, or paid on a meritorious and reasonable basis;

(iv) Liabilities that result from willful misconduct, gross negligence, or lack of good faith on the part of any of the Contractor's directors, officers, managers, superintendents, or other representatives who have supervision or direction of:

(A) All or substantially all of the Contractor's business;

(B) All or substantially all of the Contractor's operations at any one plant or separate location in which this contract is being performed; or

(C) A separate and complete major industrial operation in connection with the performance of this contract;

(v) Liabilities that arise from the willful misconduct or gross negligence of the Claimant or, in the case of a claim based on death, the claimant's estate;

(vi) Liabilities that arise from the conduct, negligence, or failure to act of Passengers, as defined in clause H.23 of this contract; or.

(vii) Liabilities that arise from Non-NASA Cargo or Payloads, as defined in clause H.23 of this contract.

(End of Clause)

H.23 NON-NASA PASSENGERS, CARGO AND PAYLOADS

This clause is applicable to CLIN 002 Post Certification Mission (PCM) task orders. The requirements of a specific PCM will be established by NASA in the task order in accordance with clause H.8, *Post Certification Mission Task Ordering Procedures (Applicable to CLIN 002).* If NASA determines, in its sole discretion, that its requirements can be met without using the full capacity of the CTS, NASA may notify the Contractor of the opportunity to propose to manifest a Passenger or non-NASA Cargo or Payload on a flight conducted under this contract as part of the task proposal process. NASA will only authorize manifesting a Passenger or non-NASA Cargo or Payload if it can be accommodated consistent with NASA's obligations to its International Partners under the Intergovernmental Agreement for the International Space Station (ISS), all applicable FAA regulations or requirements, and other applicable laws, regulations or requirements, without interference to NASA's mission or cost to NASA, and pursuant to the terms and conditions of the contract and the PCM task order.

(a) Definitions, for the purpose of this clause:

(1) NASA or NASA-sponsored crew: Personnel assigned by NASA to be transported between Earth and the ISS in the CTS.

(2) Contractor crew: Employees or subcontractors of the Contractor who perform activities in the course of employment directly relating to the operation of the CTS while on board the CTS.

(3) Passenger: Any person proposed by the Contractor to be transported on the CTS who is not NASA or NASA-sponsored crew, or Contractor crew.

(4) Non-NASA Cargo or Payload: Any property proposed by the Contractor to be flown or used on the CTS which is not the primary payload of a Post Certification Mission, nor required for certification of the CTS.

(5) Commercial Cargo Customer: Any person or entity that provides non-NASA cargo or payloads to the Contractor.

(b) NASA Unilateral Determination; NASA Right to Revoke; Costs.

The Contractor acknowledges and agrees that any decision to authorize the manifest of a Passenger(s) or non-NASA Cargo or Payload in response to a task order proposal shall be a unilateral determination at NASA's sole discretion. NASA retains the right to revoke its prior approval of a Passenger(s) or non-NASA Cargo or Payload at any time prior to launch of the Post Certification Mission. NASA shall not be responsible for any costs, liabilities or obligations incurred by the Contractor to manifest a Passenger(s) or non-NASA Cargo or Payload; NASA shall not be responsible for any costs, liabilities or obligations incurred by the Contractor should NASA revoke its prior approval of Passenger(s) or non-NASA Cargo or Payload.

If for any reason, the Contractor is unable to transport a Passenger(s), the Passenger(s) is not ready or available for the Post Certification Mission, there is insufficient time to complete Passenger

training for the Post Certification Mission before the launch date, or the Contractor is unable to meet applicable FAA or NASA requirements, the Contractor shall bear the cost of and be responsible for any related impacts or delays to the mission. If the Contractor is unable to provide the non-NASA cargo or payload for CTS integration, or there is insufficient time to complete a new mission analysis before the launch date, the Contractor shall bear the cost and shall be responsible for designing, fabricating, and installing a cargo or payload mass simulator in lieu of the non-NASA cargo or payload.

(c) Procedures.

If applicable, NASA will identify any opportunities to propose to manifest a Passenger or non-NASA cargo or payloads in the request for a task order proposal under clause H.8 (b). The Contractor shall propose at no cost to NASA the non-NASA mission requirements, if any, and price adjustment or other consideration to be received by NASA, to be included with the task order proposal for the Post Certification Mission. NASA may request task order proposals with and without Passengers or non-NASA Cargo or Payloads.

(1) Passengers.

(i) Task Order Proposal

For any task order proposal involving Passenger(s), the Contractor shall submit to NASA a detailed description of the purpose and activities of the Passenger(s), a training plan for the Passenger(s), plans for compliance with any FAA license requirements, the *ISS Medical Operations Requirements Document* (SSP 50260) and, as applicable, the *Medical Evaluation Document, Volumes A-C* (SSP 50667), the liability waiver required in paragraph (c)(1)(ii), and any additional documentation or analyses requested by NASA. The Contractor shall be responsible for the costs of and ensuring completion of all necessary training in accordance with FAA license requirements and NASA requirements, including all training required for the CTS and for the ISS, even if such training is provided by NASA.

(ii) Liability and Insurance

The Contractor shall extend section (c) of clause H.5, NFS 1852.228-76 *Cross-Waiver Of Liability For International Space Station Activities (Oct 2012) (Deviation)*, to Passengers by requiring them to waive any and all claims against the entities listed in section (c)(1) of that clause, except that Passengers are not required to waive such claims against the Contractor unless the Contractor so requires. The Contractor shall inform Passengers that the entities listed in section (c)(1) have not waived any claims against Passengers. The Contractor shall obtain a written waiver of claims from the Passenger for all activities related to the mission, including acknowledgment by the Passenger that the entities listed in section (c)(1) have not waived any claims against Passengers, and shall provide such documentation to NASA for NASA's approval with the proposal to manifest the Passenger. The Contractor shall require Passengers to maintain insurance covering damage to or loss of any property or injury or death of any person on the ISS or in the CTS resulting from any action, negligence, or failure to act by the Passenger. The Contractor shall provide acceptable evidence to the Contracting Officer of required insurance no later than thirty (30) days prior to the launch on which the Passenger is manifested. The amount of required insurance and the terms and conditions for the policy or policies shall be subject to

review by the Contracting Officer. Once reviewed, the policy or policies may not be modified or canceled without the prior, written approval of the Contracting Officer.

(2) Non-NASA Cargo or Payloads

(i) Task Order Proposal

For any task order proposal involving a Non-NASA Cargo or Payload, the Contractor shall submit to NASA a description of the purpose of the Non-NASA Cargo or Payload, a detailed cargo or payload description, a cargo or payload compatibility assessment, plans for compliance with any FAA license requirements, the liability waiver required in paragraph (c)(2)(ii), and any additional documentation or analyses requested by NASA. The Contractor shall be responsible for the costs of and ensuring completion of all FAA license requirements and all NASA requirements for the CTS and for the ISS relating to the Non-NASA Cargo or Payload, even if the Contractor requires support from NASA.

(ii) Liability and Insurance.

The Contractor shall extend section (c) of clause H.5, NFS 1852.228-76 *Cross-Waiver Of Liability For International Space Station Activities (Oct 2012) (Deviation),* to Commercial Cargo Customers by requiring them to waive any and all claims against the entities listed in section (c)(1) of that clause, except that Commercial Cargo Customers are not required to waive such claims against the Contractor unless the Contractor so requires. The Contractor shall inform Commercial Cargo Customers that the entities listed in section (c)(1) have not waived any claims against Commercial Cargo Customers. The Contractor shall obtain a written waiver of claims from the Commercial Cargo Customer for all activities related to the mission, including acknowledgment by the Commercial Cargo Customer that the entities listed in section (c)(1) have not waived any claims against Commercial Cargo Customers, and shall provide such documentation to NASA for NASA's approval with the proposal to manifest the non-NASA cargo or payload. The Contractor shall require Commercial Cargo Customers to maintain insurance covering damage to or loss of any property or injury or death of any person on the ISS or in the CTS resulting from the flight of the non-NASA Cargo or Payload. The Contractor shall provide acceptable evidence to the Contracting Officer of required insurance no later than thirty (30) days prior to the launch on which the non-NASA Cargo or Payload is manifested. The amount of required insurance and the terms and conditions for the policy or policies shall be subject to review by the Contracting Officer. Once reviewed, the policy or policies may not be modified or canceled without the prior, written approval of the Contracting Officer.

(d) Delays

The launch and mission schedule will not be changed to accommodate Passengers or Non-NASA Cargo or Payloads, except at NASA's sole discretion. If NASA chooses to reschedule the launch or mission, NASA shall not be responsible for any costs, liabilities or obligations associated with rescheduling. The provisions of clause H.20, *Adjustments To Post Certification Mission Schedule,* do not apply to circumstances arising under this clause H.23 related to requested delays to accommodate Passengers or non-NASA Cargo or Payloads. If for any reason, the Contractor is unable to transport the Passenger(s) or Non-NASA Cargo or Payload, the Passenger(s) or Non-NASA Cargo or Payload are not ready or available in time for the Post Certification Mission,

the Contractor is unable to meet applicable FAA or NASA requirements, or there is insufficient time to complete Passenger training for the Post Certification Mission before the launch date, the Contractor shall bear all costs and be responsible for any related impacts or delays to the launch or mission. In no case shall NASA be liable for any costs or expenses incurred by Commercial Cargo Customers, Passengers or by the Contractor on behalf of its Commercial Cargo Customers or Passengers.

(End of Clause)

H.24 STATEMENT ON WAIVER OF RIGHTS TO INVENTIONS

The crew transportation systems certified and used under this contract will be commercially developed, and the developers may pursue other commercial uses of their systems outside of this contract. NASA has determined that the interest of the United States would be served by waiving to the Contractor, in accordance with 51 U.S.C. 20135(g), rights to inventions or class of inventions made by the Contractor in the performance of this contract. Therefore, upon petition submitted by the Contractor, as set forth in NFS 1852.227-70, *New Technology*, NASA will waive such rights to the Contractor.

(End of Clause)

H.25 SAE AS9100

The Contractor shall have a quality program that complies with International Organization for Standardization document SAE AS9100, *Quality Management Systems – Requirements for Aviation, Space and Defense Organizations* by the Certification Baseline Review.

(a) 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. 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.

(b) If the Contractor is not SAE AS9100 certified, the Government will 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.

(End of Clause)

H.26 MISHAP REPORTING

(a) Definitions, as used in this clause,

(1) NASA Personnel: any person employed by NASA, or other Government personnel performing services on behalf of NASA.

(2) NASA Operations: any activity or process that is under NASA direct control or includes major NASA involvement.

(3) NASA Mishap: is an unplanned event that results in at least one of the following:

(i) Injury to non-NASA personnel, caused by NASA operations.

(ii) Damage to public or private property (including foreign property) not under the ownership or control of the Contractor and/or its subcontractors under this contract, caused by NASA operations or NASA-funded development or research projects.

(iii) Damage to Property (including foreign property) under the ownership or control of the Contractor and/or its subcontractors under this contract, caused by NASA operations.

(iv) Occupational injury or occupational illness to NASA personnel.

(v) Mission failure of any Flight Test or PCM before the scheduled completion of the planned primary mission.

(vi) Destruction of, or damage to, NASA property or NASA equipment.

(4) Close Call: an event in which there is no injury, or only minor injury requiring first aid, and/or no equipment/property damage or minor equipment/property damage (less than $20,000), but which possesses a potential to cause a mishap.

(5) Exposure:

(i) Vulnerability of population, property, or other value system to a given activity or hazard; or

(ii) Other measure of the opportunity for failure or mishap events to occur.

(6) Lost Time Injury/Illness: a nonfatal traumatic injury that causes any loss of time from work beyond the day or shift it occurred; or a nonfatal nontraumatic illness/disease that causes disability at anytime.

(7) Mission Failure: a mishap of whatever intrinsic severity that prevents the achievement of the success criteria or objectives as identified in the applicable Flight Test Plan or determined by clause H.21 *Post Certification Mission Success Determination*.

(8) Serious Injury: any injury resulting from a mishap in which any one or more of the following apply:

(i) Requires hospitalization for more than forty-eight (48) hours, commencing within seven (7) days from the date the injury was received.

(ii) Results in a fracture of any bone (except simple fractures of fingers, toes, or nose).

(iii) Causes severe hemorrhages or nerve, muscle, or tendon damage.

(iv) Involves any internal organ.

(v) Involves second- or third-degree burns, or any burns affecting more than five (5) percent of the body surface.

(9) Substantial Damage to property or equipment: damage or failure which adversely affects the structural strength, performance, or operational characteristics of the property or equipment, and which would normally require major repair or replacement of the affected component(s).

(b) The Contractor shall notify and promptly report to the Contracting Officer, or a designee, any of the following associated with any work performed under this Contract:

(1) Close Calls involving NASA personnel, NASA property, or NASA equipment.

(2) Exposures involving NASA personnel, NASA property, or NASA equipment, which could result in fatality; lost-time occupational injury; or occupational disease.

(3) NASA Mishaps, which result in serious injury; fatality; lost-time occupational injury; occupational disease; any environmental damage; any mission failure; or substantial damage to or loss of equipment or property damage of at least $50,000.

(c) The Contractor shall conduct a mishap investigation for any event that meets paragraph (b) requirements. The Contractor shall allow NASA participation in the investigation, and make all data and resulting reports available to NASA. The Contractor is not required to include in any report an expression of opinion as to the fault or negligence of any employee.

(1) If the Contractor conducts a mishap investigation in the performance of activities not under this contract, but relevant to the CTS design, production and operations, the Contractor shall make available to NASA all data and resulting reports.

(d) The Contractor shall maintain the data of any mishap investigation referenced above for the term of this Contract plus three (3) years.

(e) NASA may investigate any NASA mishaps or close calls that involve NASA personnel, equipment, or property, that occur in the performance of this contract in accordance with

CCT-PLN-1010, *Mishap Preparedness and Contingency Plan for Commercial Crew Program*. The Contractor shall provide personnel support and data, as necessary, to support a NASA investigation.

(f) When applicable, the Contractor shall support a Commission appointed by the President per 51 U.S.C Section 70701 *et seq.*.

(End of Clause)

H.27 GOVERNMENT-INDUSTRY DATA EXCHANGE PROGRAM (GIDEP)

(a) Definitions, as used in this clause

(1) Close-loop reporting: providing a written response of no impact, no usage or impact with rationale at program milestone and readiness reviews or according to contract or other specified reporting times/events for each GIDEP Notice and NASA Advisory.

(2) GIDEP Notices: means "GIDEP Alerts, GIDEP Safe-Alerts, GIDEP Problem Advisories, and GIDEP Agency Action Notices." Life-cycle logistics should be addressed per contractual requirements identified by the Program/Project.

(b) The Contractor shall participate in the GIDEP in accordance with the requirements of the GIDEP Operations Manual (GIDEP SO300-BT-PRO-101) and the GIDEP Requirements Guide (SO300-BU-GYD-010), available from the GIDEP Operations Center, PO Box 8000, Corona, California 92878-8000.

(c) The Contractor shall review all GIDEP Notices and designated NASA Advisories to determine if they affect the Contractor's products/and or services provided to the Government.

(d) The Contractor shall respond by stating, in writing, whether or not each GIDEP Notice and NASA Advisory affects the Contractor's products and services provided to the Government. The Contractor is responsible for stating whether or not each GIDEP Notice and NASA Advisories affects the subcontractor's products and services provided to the Government.

(e) For GIDEP Notices and NASA Advisories that affect the Contractor's products and services provided to the Government, the Contractor shall take action to eliminate or mitigate any negative effect and inform the Government of such actions to ensure GIDEP Notices and NASA Advisories adhere to close-loop reporting.

(f) The Contractor shall generate applicable GIDEP Alerts in accordance with the requirements of GIDEP SO300-BT-PRO-101 and SO300-BU-GYD-010 whenever failed or nonconforming items, available to other buyers, are discovered during the course of the Contract.

(End of Clause)

H.28 ENVIRONMENTAL COMPLIANCE AND NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENTATION

(a) Environmental Compliance. The Contractor shall ensure that all operations, activities, equipment, and facilities under this contract are in compliance with all applicable Federal, state, and local environmental laws, statutes, regulations, and ordnances. Unless otherwise stated in this contract, the Contractor shall be solely responsible for compliance with aforementioned environmental requirements including environmental permits. The Contractor shall be considered an independent entity responsible for its own actions for the purposes of environmental compliance and permitting matters.

(b) National Environmental Policy Act (NEPA). Should Contractor activities trigger the need for NEPA documentation during the performance of the contract, the Contractor shall be responsible for complying with NPR 8580.1, *NASA National Environmental Policy Act Management Requirements*, and providing documentation and supporting rationale to NASA throughout the NEPA process, as required by the Contracting Officer.

(End of Clause)

H.29 ANOMALY INVESTIGATION AND CORRECTIVE ACTION

(a) For the purposes of this clause, an anomaly is an unexpected event, hardware or software damage, departure from established procedures or performance, or a deviation of system, subsystem, or hardware or software performance outside intended design or expected performance specification limits.

(b) For the purposes of this clause, data includes, but is not limited to data associated with areas of insight identified in CCT-PLN-1100, *Crew Transportation Plan,* Appendix C, *Insight Areas*, and data relevant to the Crew Transportation System (CTS) design, production and operations.

(c) The Contractor shall notify the Government of reportable CTS anomalies. For reportable anomalies that occur during the period prior to Flight Readiness Review (FRR) for the next mission of any affected CTS vehicle, notification shall be within thirty (30) days, but no later than at FRR. Anomalies that occur after FRR shall be reported to the Government, as soon as is practical. Reportable anomalies are those that:

(1) After resolution, negatively affect CTS certification, post certification performance, hazards, hazard controls, or verifications; or

(2) Are unexplained or could not be duplicated; or

(3) Occur during standard repairs or nominal processing tasks and indicate an unexpected trend in one or more CTS vehicles.

(d) The Contractor shall determine the scope of the investigation and shall conduct and control the investigation. The Government may designate representatives to observe and participate in the Contractor's investigation. The Contractor shall accommodate Government representation to the Contractor's investigation.

(e) The Contractor shall be responsible for identifying the cause(s) of the anomaly, and implementing corrective action(s). The Contractor shall provide the Government access to any findings and any proposed corrective actions. If the Contractor implements any changes to the CTS design that could negatively affect certification, post certification performance, hazards, controls, or verifications of the CTS, the Contractor shall notify the Government of the change.

(f) The Government may conduct its own investigation of any anomaly or failed mission. The Contractor shall provide personnel support and data, as necessary, to support a Government investigation.

(End of Clause)

H.30 HAZARDOUS OPERATIONS

(a) Definitions, as used in this clause

(1) Hazardous Operations: any operation or other work activity that, without implementation of proper mitigations, has a high potential to result in loss of life, serious injury to personnel or public, or damage to property due to the material or equipment involved or the nature of the operation/activity.

(2) Hazardous Flight Operations: any Hazardous Operations performed on this contract that affect the CTS or its elements; and occur between initiation of tanking of the CTS, and post-detanking or post-flight safing. Hazardous Flight Operations may be initiated by Government or Contractor Flight Crew, Government or Contractor Ground Controllers, Government or Contractor Closeout Crew, Government or Contractor Recovery Personnel, or software.

(3) Hazardous Ground Operations: any Hazardous Operations performed on this contract, other than Hazardous Flight Operations.

(b) All Hazardous Flight Operations conducted in the performance of this contract shall be reviewed and approved through the Commercial Crew Program and/or International Space Station Program safety review processes.

(c) All Hazardous Ground Operations under control of the Contractor or Subcontractor(s) in performance of this contract shall comply with all Federal, State, and Local requirements intended to mitigate risk to personnel, equipment, and property.

(End of Clause)

H.31 INTERIM PERFORMANCE-BASED MILESTONE PAYMENTS (APPLICABLE TO CLIN 001)

SubCLINS 001A and 001B listed in CLIN 001, *DDTE/Certification,* are delivery milestones (delivery items). For each delivery milestone, the Contractor may request interim-milestone financing payments in accordance with FAR 52.232-32, *Performance Based Payments.* Milestone events, schedule, price and acceptance criteria are identified in Attachment J-03, Appendix A, *Milestone Acceptance Criteria and Payment Schedule*. The sum of interim-milestone financing payments with each delivery item shall not exceed 90% 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 each delivery item.

The ISS DCR associated with the delivery milestone (SubCLIN 001A) will be the DCR associated with the crewed flight test to ISS. The ISS DCR delivery milestone shall include all work under CLIN 001that occurs from contract start date through this milestone completion. The delivery payment for the Certification Review associated with the delivery milestone (SubCLIN 001B) will include all work under CLIN 001that occurs from this ISS DCR delivery milestone through the end of the DDTE/Certification.

The Contracting Officer will unilaterally determine the Contractor's successful accomplishment of each milestone event. The Contracting Officer's determination of milestone accomplishment will be based on the criteria listed in Attachment J-03, Appendix A, *Milestone Acceptance Criteria and Payment Schedule,* as well as the Contractor's compliance with the terms of the contract, including performance of PWS and deliverable requirements. The delivery-milestone payments are not financing payments and unlike interim-milestone payments, once made, are not subject to repayment by the Contractor if the conditions defined in FAR 52.232-32 (j), *Special terms regarding default,* apply.

Generally, milestone payment will be paid in succession. All preceding payment events shall be successfully accomplished before payment will be made for the next payment event, unless the prior written consent of the Contracting Officer is obtained.

(End of Clause)

H.32 SUBCONTRACTING WITH RUSSIAN ENTITIES FOR GOODS OR SERVICES

(a) Definitions: In this clause:

(1) The term "Russian entities" means:

(i) Russian persons, or

(ii) Entities created under Russian law or owned, in whole or in part, by Russian persons or companies including, but not limited to, the following:

(A) The Russian Federal Space Agency (Roscosmos),

(B) Any organization or entity under the jurisdiction or control of Roscosmos, or

(C) Any other organization, entity or element of the Government of the Russian Federation.

(2) The term “extraordinary payments” means payments in cash or in kind made or to be made by the United States Government prior to December 31, 2020, for work to be performed or services to be rendered prior to that date necessary to meet United States obligations under the Agreement Concerning Cooperation on the Civil International Space Station, with annex, signed at Washington January 29, 1998, and entered into force March 27, 2001, or any protocol, agreement, memorandum of understanding, or contract related thereto.

(b) This clause implements the reporting requirement in section 6(i) of the Iran, North Korea, and Syria Nonproliferation Act, as amended (INKSNA). This clause also implements section 6(a) and the exception in section 7(1)(B) of INKSNA that is applicable through December 31, 2020. NASA has applied the restrictions in INKSNA to include funding of Russian entities via U.S. Contractors.

(c) (1) The Contractor shall not subcontract with Russian entities without first receiving written approval from the Contracting Officer. In order to obtain this written approval to subcontract with any Russian entity as defined in paragraphs (a), the Contractor shall provide the Contracting Officer with the following information related to each planned new subcontract and any change to an existing subcontract with entities that fit the description in paragraph (a):

(i) A detailed description of the subcontracting entity, including its name, address, and a point of contact, as well as a detailed description of the proposed subcontract including the specific purpose of payments that will made under the subcontract.

(ii) The Contractor shall provide certification that the subcontracting entity is not, at the date of the subcontract approval request, on any of the lists of proscribed denied parties, specially designated nationals and entities of concern found at:

BIS's Listing of Entities of Concern (see http://www.access.gpo.gov/bis/ear/pdf/744spir.pdf)

BIS's List of Denied Parties (see http://www.bis.doc.gov/index.php/policy-guidance/lists-of-parties-of-concern/denied-persons-list)

OFAC's List of Specially Designated Nationals (Adobe® PDF format) (see http://www.bis.doc.gov/index.php/policy-guidance/lists-of-parties-of-concern/unverified-list)

List of Unverified Persons in Foreign Countries (see http://www.bis.doc.gov/index.php/policy-guidance/lists-of-parties-of-concern/unverified-list)

State Department's List of Parties Statutorily Debarred for Arms Export Control Act Convictions (see http://pmddtc.state.gov/compliance/debar.html)

State Department's Lists of Proliferating Entities (see http://www.state.gov/t/isn/c15231.htm)

(2) Unless relief is granted by the Contracting Officer, the information necessary to obtain approval to subcontract shall be provided to the Contracting Officer thirty (30) business days prior to executing any planned subcontract with entities defined in paragraph (a).

(d) After receiving approval to subcontract, the Contractor shall provide the Contracting Officer with a report every six (6) months that documents the individual payments made to an entity in paragraph (a). The reports are due on July 15th and January 15th. The July 15th report shall document all of the individual payments made from the previous January through June. The January 15th report shall document all of the individual payments made from the previous July through December. The content of the report shall provide the following information for each time a payment is made to an entity in paragraph (a):

(1) The name of the entity

(2) The subcontract number

(3) The amount of the payment

(4) The date of the payment

(e) The Contracting Officer may direct the Contractor to provide additional information for any other prospective or existing subcontract at any tier. The Contracting Officer may direct the Contractor to terminate for the convenience of the Government any subcontract at any tier with an entity defined in paragraph (a), subject to an equitable adjustment.

(f) All work subcontracted to the Russian Federal Space Agency, any organization or entity under the jurisdiction or control of the Russian Federal Space Agency, or any other organization, entity or element of the Government of the Russian Federation must be completed on or before December 31, 2020. No payments for such work may be made by the Contractor to the subcontractor, or by NASA to the Contractor, after December 31, 2020. The Contractor is responsible for ensuring the completion of and payment for such subcontracted work in sufficient time to enable payment by NASA to the Contractor on or before December 31, 2020.

(g) The Contractor shall include the substance of this clause in all its subcontracts, and shall require such inclusion in all other subcontracts of any tier. The Contractor shall be responsible to obtain written approval from the Contracting Officer to enter into any tier subcontract that involves entities defined in paragraph (a).

(h) Performance of this contract after December 31, 2020 may be subject to prohibitions on payments to Russian entities under INKSNA.

(End of Clause)

I.1 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):

For Federal Acquisition Regulation (FAR) clauses, see
https://www.acquisition.gov/far/

For NASA FAR Supplement (NFS) clauses, see
http://www.hq.nasa.gov/office/procurement/regs/nfstoc.htm

(End of Clause)

I.2 CLAUSES INCORPORATED BY REFERENCE -- SECTION I

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 full text of the clause is available at the addresses contained in clause I.1 52.252-2, *Clauses Incorporated by Reference*, of this contract.

52.202-1 DEFINITIONS. (JUL 2012)

52.203-3 GRATUITIES. (APR 1984)

52.203-5 COVENANT AGAINST CONTINGENT FEES. (APR 1984)

52.203-6 RESTRICTIONS ON SUBCONTRACTOR SALES TO THE GOVERNMENT. (SEP 2006)

52.203-7 ANTI-KICKBACK PROCEDURES. (OCT 2010)

52.203-8 CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY. (JAN 1997)

52.203-10 PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY. (JAN 1997)

52.203-12 LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS. (OCT 2010)

52.203-13 CONTRACTOR CODE OF BUSINESS ETHICS AND CONDUCT. (APR 2010)

52.203-14 DISPLAY OF HOTLINE POSTER(S). (DEC 2007)
[NASA Office of Inspector General, Code W, Washington, DC, 20546-0001, (202) 358-1220. http://oig.nasa.gov/hotline.html]

52.204-2 SECURITY REQUIREMENTS. (AUG 1996)

52.204-4 PRINTED OR COPIED DOUBLE-SIDED ON POSTCONSUMER FIBER CONTENT PAPER. (MAY 2011)

52.204-9 PERSONAL IDENTITY VERIFICATION OF CONTRACTOR PERSONNEL. (JAN 2011)

52.204-10 REPORTING EXECUTIVE COMPENSATION AND FIRST-TIER SUBCONTRACT AWARDS. (JUL 2013)

52.204-13 SYSTEM FOR AWARD MANAGEMENT MAINTENANCE (JUL 2013)

52.209-6 PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT. (AUG 2013)

52.210-1 MARKET RESEARCH. (APR 2011)

52.211-15 DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS. (APR 2008)

52.215-2 AUDIT AND RECORDS - NEGOTIATION. (OCT 2010)

52.215-11 PRICE REDUCTION FOR DEFECTIVE CERTIFIED COST OR PRICING DATA – MODIFICATIONS. (AUG 2011)

52.215-13 SUBCONTRACTOR CERTIFIED COST OR PRICING DATA – MODIFICATIONS. (OCT 2010)

52.215-8 ORDER OF PRECEDENCE - UNIFORM CONTRACT FORMAT. (OCT 1997)

52.217-8 OPTION TO EXTEND SERVICES. (NOV 1999)
[the sixty (60) days prior to completion of the last required milestone or delivery date].

52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS. (JAN 2011)

52.219-8 UTILIZATION OF SMALL BUSINESS CONCERNS. (JUL 2013)

52.219-9 SMALL BUSINESS SUBCONTRACTING PLAN. (Deviation per PIC 13-06 (www.hq.nasa.gov/office/procurement/regs/pic.html)) – ALTERNATE II (OCT 2001)

52.219-16 LIQUIDATED DAMAGES - SUBCONTRACTING PLAN. (JAN 1999)

52.219-28 POST-AWARD SMALL BUSINESS PROGRAM REREPRESENTATION. (JUL 2013)
The Contractor represents that it ___ is, ___ is not a small business concern under NAICS Code 336414 assigned to contract number TBD. (*Contractor to sign and date and insert authorized signer's name and title).*

52.222-1 NOTICE TO THE GOVERNMENT OF LABOR DISPUTES. (FEB 1997)

52.222-3 CONVICT LABOR. (JUN 2003)

52.222-21 PROHIBITION OF SEGREGATED FACILITIES. (FEB 1999)

52.222-26 EQUAL OPPORTUNITY. (MAR 2007)

52.222-35 EQUAL OPPORTUNITY FOR VETERANS. (SEP 2010)

52.222-36 AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES. (OCT 2010)

52.222-37 EMPLOYMENT REPORTS ON VETERANS. (SEP 2010)

52.222-40 NOTIFICATION OF EMPLOYEE RIGHTS UNDER THE NATIONAL LABOR RELATIONS ACT. (DEC 2010)

52.222-50 COMBATING TRAFFICKING IN PERSONS. (FEB 2009)

52.222-54 EMPLOYMENT ELIGIBILITY VERIFICATION. (AUG 2013)

52.223-6 DRUG-FREE WORKPLACE. (MAY 2001)

52.223-18 ENCOURAGING CONTRACTOR POLICIES TO BAN TEXT MESSAGING WHILE DRIVING. (AUG 2011)

52.225-13 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES. (JUN 2008)

52.227-1 AUTHORIZATION AND CONSENT. (DEC 2007)

52.227-2 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT. (DEC 2007)

52.227-3 PATENT INDEMNITY. (APR 1984)

52.227-16 ADDITIONAL DATA REQUIREMENTS. (JUN 1987)

52.229-3 FEDERAL, STATE, AND LOCAL TAXES. (FEB 2013)

52.232-1 PAYMENTS. (APR 1984) (Applicable to CLIN 002 and any appropriate task orders per CLIN 003)

52.232-2 PAYMENTS UNDER FIXED-PRICE RESEARCH AND DEVELOPMENT CONTRACTS. (APR 1984) (Applicable to CLIN 001 and any appropriate task orders per CLIN 003)

52.232-8 DISCOUNTS FOR PROMPT PAYMENT. (FEB 2002)

52.232-9 LIMITATION ON WITHHOLDING OF PAYMENTS. (APR 1984)

52.232-11 EXTRAS. (APR 1984)

52.232-17 INTEREST. (OCT 2010)

52.232-18 AVAILABILITY OF FUNDS. (APR 1984)

52.232-23 ASSIGNMENT OF CLAIMS. (JAN 1986)

52.232-25 PROMPT PAYMENT. (JUL 2013)

52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER- SYSTEM FOR AWARD MANAGEMENT. (JUL 2013)

52.233-1 DISPUTES. (JUL 2002) - ALTERNATE I (DEC 1991)

52.233-3 PROTEST AFTER AWARD. (AUG 1996)

52.233-4 APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM. (OCT 2004)

52.242-13 BANKRUPTCY. (JUL 1995)

52.243-1 CHANGES - FIXED-PRICE. (AUG 1987) - ALTERNATE I (APR 1984) (Applicable to CLIN 002 and any appropriate task orders per CLIN 003)

52.243-1 CHANGES - FIXED-PRICE. (AUG 1987) - ALTERNATE V (APR 1984) (Applicable to CLIN 001 and any appropriate task orders per CLIN 003)

52.243-7 NOTIFICATION OF CHANGES. (APR 1984)
Fill in (b) seven (7) calendar days
Fill in (d) seven (7) calendar days

52.244-2 SUBCONTRACTS. (OCT 2010)

52.244-6 SUBCONTRACTS FOR COMMERCIAL ITEMS. (JUL 2013)

52.245-1 GOVERNMENT PROPERTY. (APR 2012) -- Alternate I (APR 2012)

52.245-9 USE AND CHARGES. (APR 2012)

52.246-25 LIMITATION OF LIABILITY - SERVICES. (FEB 1997)

52.249-2 TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE). (APRIL 2012)

52.253-1 COMPUTER GENERATED FORMS. (JAN 1991)

NFS 1852.203-70 DISPLAY OF INSPECTOR GENERAL HOTLINE POSTERS. (JUN 2001)

NFS 1852.204-76 SECURITY REQUIREMENTS FOR UNCLASSIFIED INFORMATION TECHNOLOGY RESOURCES (JAN 2011)

NFS 1852.209-72 COMPOSITION OF THE CONTRACTOR. (DEC 1988)

NFS 1852.219-74 USE OF RURAL AREA SMALL BUSINESSES. (SEP 1990)

NFS 1852.219-76 NASA 8 PERCENT GOAL. (JUL 1997)

NFS 1852.219-77 NASA MENTOR-PROTEGE PROGRAM. (MAY 2009)

NFS 1852.243-71 SHARED SAVINGS. (MAR 1997)

NFS 1852.235-70 CENTER FOR AEROSPACE INFORMATION. (DEC 2006)

(End of Clause)

I.3 52.209-9 UPDATES OF PUBLICLY AVAILABLE INFORMATION REGARDING RESPONSIBILITY MATTERS (JUL 2013)

(a) The Contractor shall update the information in the Federal Awardee Performance and Integrity Information System (FAPIIS) on a semi-annual basis, throughout the life of the contract, by

posting the required information in the System for Award Management database via *https://www.acquisition.gov*.

(b) As required by section 3010 of the Supplemental Appropriations Act, 2010 (Pub. L. 111-212), all information posted in FAPIIS on or after April 15, 2011, except past performance reviews, will be publicly available. FAPIIS consist of two segments—

(1) The non-public segment, into which Government officials and the Contractor post information, which can only be viewed by—

(i) Government personnel and authorized users performing business on behalf of the Government; or

(ii) The Contractor, when viewing data on itself; and

(2) The publicly-available segment, to which all data in the non-public segment of FAPIIS is automatically transferred after a waiting period of 14 calendar days, except for--

(i) Past performance reviews required by subpart 42.15;

(ii) Information that was entered prior to April 15, 2011; or

(iii) Information that is withdrawn during the 14-calendar-day waiting period by the Government official who posted it in accordance with paragraph (c)(1) of this clause.

(c) The Contractor will receive notification when the Government posts new information to the Contractor's record.

(1) If the Contractor asserts in writing within 7 calendar days, to the Government official who posted the information, that some of the information posted to the non-public segment of FAPIIS is covered by a disclosure exemption under the Freedom of Information Act, the Government official who posted the information must within 7 calendar days remove the posting from FAPIIS and resolve the issue in accordance with agency Freedom of Information procedures, prior to reposting the releasable information. The Contractor must cite 52.209-9 and request removal within 7 calendar days of the posting to FAPIIS.

(2) The Contractor will also have an opportunity to post comments regarding information that has been posted by the Government. The comments will be retained as long as the associated information is retained, i.e., for a total period of 6 years. Contractor comments will remain a part of the record unless the Contractor revises them.

(3) As required by section 3010 of Pub. L. 111-212, all information posted in FAPIIS on or after April 15, 2011, except past performance reviews, will be publicly available.

(d) Public requests for system information posted prior to April 15, 2011, will be handled under Freedom of Information Act procedures, including, where appropriate, procedures promulgated under E.O. 12600.

(End of Clause)

I.4 52.215-21 REQUIREMENTS FOR CERTIFIED COST OR PRICING DATA AND DATA OTHER THAN CERTIFIED COST OR PRICING DATA – MODIFICATIONS. (OCT 2010) (This Clause Is Applicable To The Extent That Only Subcontractors Are Required To Submit Certified Cost Or Pricing Data)

(a) *Exceptions from certified cost or pricing data.*

(1) In lieu of submitting certified cost or pricing data for modifications under this contract, for price adjustments expected to exceed the threshold set forth at FAR 15.403-4 on the date of the agreement on price or the date of the award, whichever is later, the Contractor may submit a written request for exception by submitting the information described in the following subparagraphs. The Contracting Officer may require additional supporting information, but only to the extent necessary to determine whether an exception should be granted, and whether the price is fair and reasonable –

(i) *Identification of the law or regulation establishing the price offered*. If the price is controlled under law by periodic rulings, reviews, or similar actions of a governmental body, attach a copy of the controlling document, unless it was previously submitted to the contracting office.

(ii) *Information on modifications of contracts or subcontracts for commercial items.*

(A) If --

(1) The original contract or subcontract was granted an exception from certified cost or pricing data requirements because the price agreed upon was based on adequate price competition or prices set by law or regulation, or was a contract or subcontract for the acquisition of a commercial item; and

(2) The modification (to the contract or subcontract) is not exempted based on one of these exceptions, then the Contractor may provide information to establish that the modification would not change the contract or subcontract from a contract or subcontract for the acquisition of a commercial item to a contract or subcontract for the acquisition of an item other than a commercial item.

(B) For a commercial item exception, the Contractor shall provide, at a minimum, information on prices at which the same item or similar items have previously been sold that is adequate for evaluating the reasonableness of the price of the modification. Such information may include –

(1) For catalog items, a copy of or identification of the catalog and its date, or the appropriate pages for the offered items, or a statement that the catalog is on file in the buying office to which the proposal is being submitted. Provide a copy or describe current discount policies and price lists (published or unpublished), e.g., wholesale, original equipment manufacturer, or reseller. Also explain the basis of each offered price and its relationship to the established catalog price, including how the proposed price relates to the price of recent sales in quantities similar to the proposed quantities.

(2) For market-priced items, the source and date or period of the market quotation or other basis for market price, the base amount, and applicable discounts. In addition, describe the nature of the market.

(3) For items included on an active Federal Supply Service Multiple Award Schedule contract, proof that an exception has been granted for the schedule item.

(2) The Contractor grants the Contracting Officer or an authorized representative the right to examine, at any time before award, books, records, documents, or other directly pertinent records to verify any request for an exception under this clause, and the reasonableness of price. For items priced using catalog or market prices, or law or regulation, access does not extend to cost or profit information or other data relevant solely to the Contractor's determination of the prices to be offered in the catalog or marketplace.

(b) *Requirements for certified cost or pricing data.* If the Contractor is not granted an exception from the requirement to submit certified cost or pricing data, the following applies:

(1) The Contractor shall submit certified cost or pricing data, data other than certified cost or pricing data, and supporting attachments in accordance with the instruction contained in Table 15-2 of FAR 15.408, which is incorporated by reference with the same force and effect as though it were inserted here in full text. The instructions in Table 15-2 are incorporated as a mandatory format to be used in this contract, unless the Contracting Officer and the Contractor agree to a different format and change this clause to use Alternate I.

(2) As soon as practicable after agreement on price, but before award (except for unpriced actions), the Contractor shall submit a Certificate of Current Cost or Pricing Data, as prescribed by FAR 15.406-2.

(End of Clause)

I.5 52.215-21 REQUIREMENTS FOR CERTIFIED COST OR PRICING DATA AND DATA OTHER THAN CERTIFIED COST OR PRICING DATA - MODIFICATIONS. (OCT 2010) - Alternate IV (OCT 2010) (This Clause Is Not Applicable To Subcontractors)

(a) Submission of certified cost or pricing data is not required.

(b) Provide information described below: [If required by the Government, the Contractor(s) shall submit *Data Other than Certified Cost or Pricing Data* as defined in Clause G.9, *Requirements for Data Other than Certified Cost or Pricing Data* to permit an adequate evaluation of the proposed price in accordance with 15.403-3.]

(End of Clause)

I.6 52.216-18 ORDERING (OCT 1995) (Applicable to IDIQ CLINs 002 and 003)

(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 up to 5-years from the effective date of the contract.

(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) If mailed, a delivery order or task order is considered "issued" when the Government deposits the order in the mail. Orders may be issued orally, by facsimile, or by electronic commerce methods only if authorized in the Schedule.

(End of Clause)

I.7 52.216-19 ORDER LIMITATIONS (OCT 1995) (Applicable to IDIQ CLINs 002 and 003)

(a) Minimum order. When the Government requires supplies or services covered by this contract in an amount of less than

(a) One (1) Post Certification Mission, pursuant to CLIN 002 or

(b) A Special Studies Task order valued at $5,000, pursuant to CLIN 003, or

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 [redacted];

(2) Any order for a combination of items in excess of [redacted]; or

(3) A series of orders from the same ordering office within 10 days that together call for quantities exceeding the limitation in subparagraph (b)(1) or (2) of this section.

(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) of this section.

(d) Notwithstanding paragraphs (b) and (c) of this section, 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 15 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.8 52.216-22 INDEFINITE QUANTITY (OCT 1995) (Applicable to IDIQ CLINs 002 and 003)

(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."

(c) 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 three years after the end of the ordering period.

(End of Clause)

I.9 52.227-11 PATENT RIGHTS--OWNERSHIP BY THE CONTRACTOR. (DEC 2007) / AS MODIFIED PER 1852.227-11 PATENT RIGHTS - RETENTION BY THE CONTRACTOR (SHORT FORM).

(a) As used in this clause -
"Invention" means any invention or discovery that is or may be patentable or otherwise protectable under title 35 of the U.S. Code, or any variety of plant that is or may be protectable under the Plant Variety Protection Act (7 U.S.C. 2321, *et seq*.)

"Made" means –

(1) When used in relation to any invention other than a plant variety, the conception or first actual reduction to practice of the invention; or

(2) When used in relation to a plant variety, that the Contractor has at least tentatively determined that the variety has been reproduced with recognized characteristics.

"Nonprofit organization" means a university or other institution of higher education or an organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c)) and exempt from taxation under section 501(a) of the Internal Revenue Code (26 U.S.C. 501(a)), or any nonprofit scientific or educational organization qualified under a State nonprofit organization statute.

"Practical application" means to manufacture, in the case of a composition of product; to practice, in the case of a process or method; or to operate, in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are, to the extent permitted by law or Government regulations, available to the public on reasonable terms.

"Subject invention" means any invention of the Contractor made in the performance of work under this contract.

(b) Contractor's rights.

(1) Ownership. The Contractor may retain ownership of each subject invention throughout the world in accordance with the provisions of this clause.

(2) License.

(i) The Contractor shall retain a nonexclusive royalty-free license throughout the world in each subject invention to which the Government obtains title, unless the Contractor fails to disclose the invention within the times specified in paragraph (c) of this clause. The Contractor's license extends to any domestic subsidiaries and affiliates within the corporate structure of which the Contractor is a part, and includes the right to grant sublicenses to the extent the Contractor was legally obligated to do so at contract award. The license is transferable only

with the written approval of the agency, except when transferred to the successor of that part of the Contractor's business to which the invention pertains.

(ii) The Contractor's license may be revoked or modified by the agency to the extent necessary to achieve expeditious practical application of the subject invention in a particular country in accordance with the procedures in FAR 27.302(i)(2) and 27.304-1(f).

(c) Contractor's obligations.

(1) The Contractor shall disclose in writing each subject invention to the Contracting Officer within 2 months after the inventor discloses it in writing to Contractor personnel responsible for patent matters. The disclosure shall identify the inventor(s) and this contract under which the subject invention was made. It shall be sufficiently complete in technical detail to convey a clear understanding of the subject invention. The disclosure shall also identify any publication, on sale (i.e., sale or offer for sale), or public use of the subject invention, or whether a manuscript describing the subject invention has been submitted for publication and, if so, whether it has been accepted for publication. In addition, after disclosure to the agency, the Contractor shall promptly notify the Contracting Officer of the acceptance of any manuscript describing the subject invention for publication and any on sale or public use.

(2) The Contractor shall elect in writing whether or not to retain ownership of any subject invention by notifying the Contracting Officer within 2 years of disclosure to the agency. However, in any case where publication, on sale, or public use has initiated the 1-year statutory period during which valid patent protection can be obtained in the United States, the period for election of title may be shortened by the agency to a date that is no more than 60 days prior to the end of the statutory period.

(3) The Contractor shall file either a provisional or a nonprovisional patent application or a Plant Variety Protection Application on an elected subject invention within 1 year after election. However, in any case where a publication, on sale, or public use has initiated the 1-year statutory period during which valid patent protection can be obtained in the United States, the Contractor shall file the application prior to the end of that statutory period. If the Contractor files a provisional application, it shall file a nonprovisional application within 10 months of the filing of the provisional application. The Contractor shall file patent applications in additional countries or international patent offices within either 10 months of the first filed patent application (whether provisional or nonprovisional) or 6 months from the date permission is granted by the Commissioner of Patents to file foreign patent applications where such filing has been prohibited by a Secrecy Order.

(4) The Contractor may request extensions of time for disclosure, election, or filing under paragraphs (c)(1), (c)(2), and (c)(3) of this clause.

(5) The Contractor may use whatever format is convenient to disclose subject inventions required in subparagraph (c) (1). NASA prefers that the Contractor use either the electronic or paper version of NASA Form 1679, *Disclosure of Invention and New Technology (Including Software)* to disclose subject inventions. Both the electronic and paper versions of NASA Form

1679 may be accessed at the electronic New Technology Reporting Web site http://invention.nasa.gov.

(d) Government's rights –

(1) Ownership. The Contractor shall assign to the agency, on written request, title to any subject invention –

(i) If the Contractor fails to disclose or elect ownership to the subject invention within the times specified in paragraph (c) of this clause, or elects not to retain ownership; provided, that the agency may request title only within 60 days after learning of the Contractor's failure to disclose or elect within the specified times.

(ii) In those countries in which the Contractor fails to file patent applications within the times specified in paragraph (c) of this clause; provided, however, that if the Contractor has filed a patent application in a country after the times specified in paragraph (c) of this clause, but prior to its receipt of the written request of the agency, the Contractor shall continue to retain ownership in that country.

(iii) In any country in which the Contractor decides not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in reexamination or opposition proceeding on, a patent on a subject invention.

(2) License. If the Contractor retains ownership of any subject invention, the Government shall have a nonexclusive, nontransferable, irrevocable, paid-up license to practice, or have practiced for or on its behalf, the subject invention throughout the world.

(e) Contractor action to protect the Government's interest.

(1) The Contractor shall execute or have executed and promptly deliver to the agency all instruments necessary to –

(i) Establish or confirm the rights the Government has throughout the world in those subject inventions in which the Contractor elects to retain ownership; and

(ii) Assign title to the agency when requested under paragraph (d) of this clause and to enable the Government to obtain patent protection and plant variety protection for that subject invention in any country.

(2) The Contractor shall require, by written agreement, its employees, other than clerical and nontechnical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters and in the Contractor's format, each subject invention in order that the Contractor can comply with the disclosure provisions of paragraph (c) of this clause, and to execute all papers necessary to file patent applications on subject inventions and to establish the Government's rights in the subject inventions. The disclosure format should require, as a minimum, the information required by paragraph (c)(1) of this clause. The Contractor shall

instruct such employees, through employee agreements or other suitable educational programs, as to the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to U.S. or foreign statutory bars.

(3) The Contractor shall notify the Contracting Officer of any decisions not to file a nonprovisional patent application, continue the prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceeding on a patent, in any country, not less than 30 days before the expiration of the response or filing period required by the relevant patent office.

(4) The Contractor shall include, within the specification of any United States nonprovisional patent or plant variety protection application and any patent or plant variety protection certificate issuing thereon covering a subject invention, the following statement, "This invention was made with Government support under (identify the contract) awarded by (identify the agency). The Government has certain rights in the invention."

(5) The Contractor shall provide the Contracting Officer the following:

(i) A listing every 12 months (or such longer period as the Contracting Officer may specify) from the date of the contract, of all subject inventions required to be disclosed during the period.

(ii) A final report prior to closeout of the contract listing all subject inventions or certifying that there were none.

(iii) Upon request, the filing date, serial number and title, a copy of the patent application, and patent number and issue date for any subject invention in any country in which the Contractor has applied for patents.

(iv) An irrevocable power to inspect and make copies of the patent application file, by the Government, when a Federal Government employee is a coinventor.

(f) Reporting on utilization of subject inventions. The Contractor shall submit, on request, periodic reports no more frequently than annually on the utilization of a subject invention or on efforts at obtaining utilization of the subject invention that are being made by the Contractor or its licensees or assignees. The reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Contractor, and other data and information as the agency may reasonably specify. The Contractor also shall provide additional reports as may be requested by the agency in connection with any march-in proceeding undertaken by the agency in accordance with paragraph (h) of this clause. The Contractor also shall mark any utilization report as confidential/proprietary to help prevent inadvertent release outside the Government. As required by 35 U.S.C. 202(c)(5), the agency will not disclose that information to persons outside the Government without the Contractor's permission.

(g) Preference for United States industry. Notwithstanding any other provision of this clause, neither the Contractor nor any assignee shall grant to any person the exclusive right to use or sell

any subject invention in the United States unless the person agrees that any products embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the United States. However, in individual cases, the requirement for an agreement may be waived by the agency upon a showing by the Contractor or its assignee that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States, or that under the circumstances domestic manufacture is not commercially feasible.

(h) March-in rights. The Contractor acknowledges that, with respect to any subject invention in which it has retained ownership, the agency has the right to require licensing pursuant to 35 U.S.C. 203 and 210(c), and in accordance with the procedures in 37 CFR 401.6 and any supplemental regulations of the agency in effect on the date of contract award.

(i) Special provisions for contracts with nonprofit organizations. If the Contractor is a nonprofit organization, it shall –

(1) Not assign rights to a subject invention in the United States without the written approval of the agency, except where an assignment is made to an organization that has as one of its primary functions the management of inventions, provided, that the assignee shall be subject to the same provisions as the Contractor;

(2) Share royalties collected on a subject invention with the inventor, including Federal employee co-inventors (but through their agency if the agency deems it appropriate) when the subject invention is assigned in accordance with 35 U.S.C. 202(e) and 37 CFR 401.10;

(3) Use the balance of any royalties or income earned by the Contractor with respect to subject inventions, after payment of expenses (including payments to inventors) incidental to the administration of subject inventions for the support of scientific research or education; and

(4) Make efforts that are reasonable under the circumstances to attract licensees of subject inventions that are small business concerns, and give a preference to a small business concern when licensing a subject invention if the Contractor determines that the small business concern has a plan or proposal for marketing the invention which, if executed, is equally as likely to bring the invention to practical application as any plans or proposals from applicants that are not small business concerns; provided, that the Contractor is also satisfied that the small business concern has the capability and resources to carry out its plan or proposal. The decision whether to give a preference in any specific case will be at the discretion of the Contractor.

(5) Allow the Secretary of Commerce to review the Contractor's licensing program and decisions regarding small business applicants, and negotiate changes to its licensing policies, procedures, or practices with the Secretary of Commerce when the Secretary's review discloses that the Contractor could take reasonable steps to more effectively implement the requirements of paragraph (i)(4) of this clause.

(j) Communications. The Contractor shall contact the Contracting Officer for any communications regarding this clause.

(k) Subcontracts.

(1) The Contractor shall include the substance of this clause, including this paragraph (k), in all subcontracts for experimental, developmental, or research work to be performed by a small business concern or nonprofit organization.

(2) The Contractor shall include the clause in the NASA FAR Supplement at 1852.227-70, New Technology, suitably modified to identify the parties, in all subcontracts, regardless of tier, for experimental, developmental, research, design, or engineering work to be performed by other than a small business firm or nonprofit organization.

(3) At all tiers, the patent rights clause must be modified to identify the parties as follows: references to the Government are not changed, and the subcontractor has all rights and obligations of the Contractor in the clause. The Contractor shall not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractor's subject inventions.

(4) In subcontracts, at any tier, the agency, 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 agency with respect to the matters covered by the clause; provided, however, that nothing in this paragraph is intended to confer any jurisdiction under the Contract Disputes Act in connection with proceedings under paragraph (h) of this clause.

(End of Clause)

I.10 52.227-14 RIGHTS IN DATA – GENERAL, (DEC 2007) (Deviation) / ALTERNATE I, (DEC 2007) (Deviation) / ALTERNATE II, (DEC 2007) (Deviation) / ALTERNATE III (DEC 2007) (Deviation) / AS MODIFIED PER 1852.227-14 RIGHTS IN DATA - GENERAL

(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.

"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.

"Government purpose" means any activity in which the United States Government is a party, including, but not limited to, cooperative activities with international or multi-national defense organizations, or sales or transfers by the United States Government to foreign governments or international organizations. Government purposes include competitive procurement.

“Government purpose rights” means the rights to (i) Use, modify, reproduce, manufacture, release, perform, display, or disclose data within the Government without restriction; and (ii) Release or disclose data outside the Government and authorize persons to whom release or disclosure has been made to use, modify, reproduce, manufacture, release, perform, display, or disclose that data for United States Government purposes.

“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, developed wholly or in part at private expense that embody trade secrets or are commercial or financial and confidential or privileged.

“Restricted computer software” means computer software developed wholly or in part 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 term includes recorded information of a scientific or technical nature that is included in computer databases (See 41 U.S.C. 403(8)).

“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 exclusively at Government expense;

(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.

(3) There shall be a presumption that modifications to data identified in FAR 52.227-15 comprise limited rights data or restricted computer software.

(4) Data delivered under this contract, in which the Government previously obtained less than limited or restricted rights, as defined in paragraph (g) of this clause, pursuant to the terms of another contract or agreement, comprises limited rights data or restricted computer software under this contract.

(5) In the event this contract is terminated for default, the Government shall have Government purpose rights in all data first produced, and all software first developed, wholly or in part at private expense in performance of this contract.

(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 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.

(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—

(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) (i) The Contractor agrees not to establish claim to copyright, publish or release to others any computer software first produced in the performance of this contract without the Contracting Officer's prior written permission.

(ii) 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)(3)(i) of this clause, the Contracting Officer may direct the Contractor to assert, or authorize the assertion of, claim to copyright in such data and to assign, or obtain the assignment of, such copyright to the Government or its designated assignee.

(iii) Whenever the word "establish" is used in this clause, with reference to a claim to copyright, it shall be construed to mean "assert".

(4) *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.

(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. 253d, 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.

(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, subject to the provisions of paragraphs (e) and (f) of this clause, in accordance with the notice:

Limited Rights Notice (Dec 2007) (Deviation)

(a) These data are submitted with limited rights under Government Contract No. _____ (and subcontract _____, if appropriate). 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 the International Space Station; provided that the Government makes such disclosure subject to prohibition against further use and disclosure.

(b) In the event this contract is terminated for Contractor default, the Government shall have Government purpose rights in all data first produced wholly or in part at private expense in performance of this contract.

(c) This notice shall be marked on any reproduction of these data, in whole or in part.

(End of notice)

(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) (Deviation)

(a) This computer software is submitted with restricted rights under Government Contract No. _____ (and subcontract _____, if appropriate). 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) In the event this contract is terminated for Contractor default, the Government shall have Government purpose rights in all computer software first developed wholly or in part at private expense in performance of this contract.

(f) 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. _____ (and subcontract, if appropriate) with _____ (name of Contractor and subcontractor).

(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 except as specifically set forth in paragraph (b) of this clause.

(End of Clause)

I.11 52.232-32 PERFORMANCE-BASED PAYMENTS (APR 2012) (Deviation), (Applicable to Interim Performance-Based Payments Events)

(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 15th 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 performance criterion, or into any of the conditions listed in paragraph (e) 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) *Reserved.*

(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

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;

(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.12 52.232-99 PROVIDING ACCELERATED PAYMENT TO SMALL BUSINESS SUBCONTRACTORS (AUG 2012) (DEVIATION)

This clause implements the temporary policy provided by OMB Policy Memorandum M-12-16, Providing Prompt Payment to Small Business Subcontractors, dated July 11, 2012.

(a) Upon receipt of accelerated payments from the Government, the Contractor is required to make accelerated payments to small business subcontractors to the maximum extent practicable after receipt of a proper invoice and all proper documentation from the small business

subcontractor.

(b) Include the substance of this clause, including this paragraph (b), in all subcontracts with small business concerns.

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

(End of Clause)

I.13 52.249-8 DEFAULT (FIXED-PRICE SUPPLY AND SERVICE) (APR 1984) (Applicable To CLIN 002 And Any Appropriate Task Orders Per CLIN 003) (DEVIATION)

(a) (1) The Government may, subject to paragraphs (c) and (d) and (i) of this clause, by written notice of default to the Contractor, terminate this contract in whole or in part if the Contractor fails to --

(i) Deliver the supplies or to perform the services within the time specified in this contract or any extension;

(ii) Make progress, so as to endanger performance of this contract (but see subparagraph (a)(2) of this clause); or

(iii) Perform any of the other provisions of this contract (but see subparagraph (a)(2) of this clause).

(2) The Government's right to terminate this contract under subdivisions (a)(1)(ii) and (1)(iii) of this clause, may be exercised if the Contractor does not cure such failure within 10 days (or more if authorized in writing by the Contracting Officer) after receipt of the notice from the Contracting Officer specifying the failure.

(b) If the Government terminates this contract in whole or in part, it may acquire, under the terms and in the manner the Contracting Officer considers appropriate, supplies or services similar to those terminated, and the Contractor will be liable to the Government for any excess costs for those supplies or services limited to $200 million for all task orders ordered and not accepted under CLIN 002 and CLIN 003. The $200 million is a cumulative total to include any excess re-procurement costs assessed under FAR 52.249-9, *Default (Fixed-Price Research and Development)* as modified within this contract. However, the Contractor shall continue the work not terminated.

(c) Except for defaults of subcontractors at any tier, the Contractor shall not be liable for any excess costs if the failure to perform the contract arises from causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include

(1) acts of God or of the public enemy,

(2) acts of the Government in either its sovereign or contractual capacity,

(3) fires,

(4) floods,

(5) epidemics,

(6) quarantine restrictions,

(7) strikes,

(8) freight embargoes, and

(9) unusually severe weather.

In each instance the failure to perform must be beyond the control and without the fault or negligence of the Contractor.

(d) If the failure to perform is caused by the default of a subcontractor at any tier, and if the cause of the default is beyond the control of both the Contractor and subcontractor, and without the fault or negligence of either, the Contractor shall not be liable for any excess costs for failure to perform, unless the subcontracted supplies or services were obtainable from other sources in sufficient time for the Contractor to meet the required delivery schedule.

(e) If this contract is terminated for default, the Government may require the Contractor to transfer title and deliver to the Government, as directed by the Contracting Officer, any

(1) completed supplies, and

(2) partially completed supplies and materials, parts, tools, dies, jigs, fixtures, plans, drawings, information, and contract rights (collectively referred to as “manufacturing materials” in this clause) that the Contractor has specifically produced or acquired for the terminated portion of this contract.

Upon direction of the Contracting Officer, the Contractor shall also protect and preserve property in its possession in which the Government has an interest.

(f) The Government shall pay contract price for completed supplies delivered and accepted. The Contractor and Contracting Officer shall agree on the amount of payment for manufacturing materials delivered and accepted and for the protection and preservation of the property. Failure to agree will be a dispute under the Disputes clause. The Government may withhold from these amounts any sum the Contracting Officer determines to be necessary to protect the Government against loss because of outstanding liens or claims of former lien holders.

(g) If, after termination, it is determined that the Contractor was not in default, or that the default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Government.

(h) The rights and remedies of the Government in this clause are in addition to any other rights and remedies provided by law or under this contract.

(i) The rights and remedies of the Government under this clause are superseded by the conditions in clause H.21 *Post Certification Mission Success Determination*, specific to the Post Certification Mission (PCM) flights that end in a mission failure or partial mission success. A mission failure or partial mission success determination pursuant to clause H.21for a PCM shall not be the basis for a default termination for that PCM task order under this clause. For all other activities under the contract not part of this PCM task order, the Government reserves the right to terminate the contract for default.

(End of Clause)

I.14 52.249-9 DEFAULT (FIXED-PRICE RESEARCH AND DEVELOPMENT) (APR 1984) (Applicable To CLIN 001 And Any Appropriate Task Orders Per CLIN 003) (DEVIATION)

(a) (1) The Government may, subject to paragraphs (c) and (d) of this clause, by written Notice of Default to the Contractor, terminate this contract in whole or in part if the Contractor fails to --

(i) Perform the work under the contract within the time specified in this contract or any extension;

(ii) Prosecute the work so as to endanger performance of this contract (but see subparagraph (a)(2) of this clause); or

(iii) Perform any of the other provisions of this contract (but see subparagraph (a)(2) of this clause).

(2) The Government's right to terminate this contract under subdivisions (a)(1)(ii) and (iii) of this clause may be exercised if the Contractor does not cure such failure within 10 days (or more, if authorized in writing by the Contracting Officer) after receipt of the notice from the Contracting Officer specifying the failure.

(b) If the Government terminates this contract in whole or in part, it may acquire, under the terms and in the manner the Contracting Officer considers appropriate, work similar to the work terminated, and the Contractor will be liable to the Government for any excess costs for the similar work limited to 200 million dollars, for work under CLIN 001 and for all task orders ordered and not accepted under CLIN 003. The 200 million dollars is a cumulative total to include any excess re-procurement costs assessed under FAR 52.249-8, *Default (Fixed-Price Supply and Service)* as modified within this contract. However, the Contractor shall continue the work not terminated.

(c) Except for defaults of subcontractors at any tier, the Contractor shall not be liable for any excess costs if the failure to perform the contract arises from causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include

(1) acts of God or of the public enemy,

(2) acts of the Government in either its sovereign or contractual capacity,

(3) fires,

(4) floods,

(5) epidemics,

(6) quarantine restrictions,

(7) strikes,

(8) freight embargoes, and

(9) unusually severe weather.

In each instance the failure to perform must be beyond the control and without the fault or negligence of the Contractor.

(d) If the failure to perform is caused by the default of a subcontractor at any tier, and if the cause of the default is beyond the control of both the Contractor and subcontractor, and without the fault or negligence of either, the Contractor shall not be liable for any excess costs for failure to perform, unless the subcontracted supplies or services were obtainable from other sources in sufficient time for the Contractor to meet the required delivery schedule or other performance requirements.

(e) If this contract is terminated for default, the Government may require the Contractor to transfer title and deliver to the Government, as directed by the Contracting Officer, any

(1) completed or partially completed work not previously delivered to, and accepted by, the Government and

(2) other property, including contract rights, specifically produced or acquired for the terminated portion of this contract.

Upon direction of the Contracting Officer, the Contractor shall also protect and preserve property in its possession in which the Government has an interest.

(f) The Government shall pay the contract price, if separately stated, for completed work it has accepted and the amount agreed upon by the Contractor and the Contracting Officer for

(1) completed work for which no separate price is stated,

(2) partially completed work,

(3) other property described above that it accepts, and

(4) the protection and preservation of the property.

Failure to agree will be a dispute under the Disputes clause. The Government may withhold from these amounts any sum the Contracting Officer determines to be necessary to protect the Government against loss from outstanding liens or claims of former lien holders.

(g) If, after termination, it is determined that the Contractor was not in default, or that the default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Government.

(h) The rights and remedies of the Government in this clause are in addition to any other rights and remedies provided by law or under this contract.

(End of Clause)

I.15 52.252-6 AUTHORIZED DEVIATIONS IN CLAUSES (APR 1984)

(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.

(b) The use in this solicitation or contract of any NFS (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.16 NFS 1852.215-84 OMBUDSMAN. (NOV 2011) -- Alternate I (JUN 2000)

(a) An ombudsman has been appointed to hear and facilitate the resolution of concerns from Offerors, potential Offerors, and Contractors during the preaward and postaward phases of this acquisition. When requested, the ombudsman will maintain strict confidentiality as to the source of the concern. The existence of the ombudsman is not to diminish the authority of the contracting officer, the Source Evaluation Board, or the selection official. Further, the ombudsman does not participate in the evaluation of proposals, the source selection process, or the adjudication of formal contract disputes. Therefore, before consulting with an ombudsman, interested parties must first address their concerns, issues, disagreements, and/or recommendations to the contracting officer for resolution.

(b) If resolution cannot be made by the contracting officer, interested parties may contact the installation ombudsman, whose name, address, telephone number, facsimile number, and email address may be found at: http://prod.nais.nasa.gov/pub/pub_library/Omb.html. Concerns, issues, disagreements, and recommendations which cannot be resolved at the installation may be referred to the Agency ombudsman identified at the above URL. Please do not contact the ombudsman to request copies of the solicitation, verify offer due date, or clarify technical requirements. Such inquiries shall be directed to the Contracting Officer or as specified elsewhere in this document.

(c) If this is a task or delivery order contract, the ombudsman shall review complaints from Contractors and ensure they are afforded a fair opportunity to be considered, consistent with the procedures of the contract.

(End of Clause)

I.17 NFS 1852.225-71 RESTRICTION ON FUNDING ACTIVITY WITH CHINA (FEB 2012)

(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.18 NFS 1852.237-72 ACCESS TO SENSITIVE INFORMATION (JUN 2005)

(a) As used in this clause, “sensitive information”' refers to information that a Contractor has developed at private expense, or that the Government has generated that qualifies for an exception to the Freedom of Information Act, which is not currently in the public domain, and which may embody trade secrets or commercial or financial information, and which may be sensitive or privileged.

(b) To assist NASA in accomplishing management activities and administrative functions, the Contractor shall provide the services specified elsewhere in this contract.

(c) If performing this contract entails access to sensitive information, as defined above, the Contractor agrees to--

(1) Utilize any sensitive information coming into its possession only for the purposes of performing the services specified in this contract, and not to improve its own competitive position in another procurement.

(2) Safeguard sensitive information coming into its possession from unauthorized use and disclosure.

(3) Allow access to sensitive information only to those employees that need it to perform services under this contract.

(4) Preclude access and disclosure of sensitive information to persons and entities outside of the Contractor's organization.

(5) Train employees who may require access to sensitive information about their obligations to utilize it only to perform the services specified in this contract and to safeguard it from unauthorized use and disclosure.

(6) Obtain a written affirmation from each employee that he/she has received and will comply with training on the authorized uses and mandatory protections of sensitive information needed in performing this contract.

(7) Administer a monitoring process to ensure that employees comply with all reasonable security procedures, report any breaches to the Contracting Officer, and implement any necessary corrective actions.

(d) The Contractor will comply with all procedures and obligations specified in its Organizational Conflicts of Interest Avoidance Plan, which this contract incorporates as a compliance document.

(e) The nature of the work on this contract may subject the Contractor and its employees to a variety of laws and regulations relating to ethics, conflicts of interest, corruption, and other criminal or civil matters relating to the award and administration of government contracts. Recognizing that this contract establishes a high standard of accountability and trust, the Government will carefully review the Contractor's performance in relation to the mandates and restrictions found in these laws and regulations. Unauthorized uses or disclosures of sensitive information may result in termination of this contract for default, or in debarment of the Contractor for serious misconduct affecting present responsibility as a Government Contractor.

(f) The Contractor shall include the substance of this clause, including this paragraph (f), suitably modified to reflect the relationship of the parties, in all subcontracts that may involve access to sensitive information

(End of Clause)

I.19 NFS 1852.237-73 RELEASE OF SENSITIVE INFORMATION (JUN 2005)

(a) As used in this clause, "Sensitive information" refers to information, not currently in the public domain, that the Contractor has developed at private expense, that may embody trade secrets or commercial or financial information, and that may be sensitive or privileged.

(b) In accomplishing management activities and administrative functions, NASA relies heavily on the support of various service providers. To support NASA activities and functions, these service providers, as well as their subcontractors and their individual employees, may need access to sensitive information submitted by the Contractor under this contract. By submitting this proposal or performing this contract, the Contractor agrees that NASA may release to its service providers, their subcontractors, and their individual employees, sensitive information submitted during the course of this procurement, subject to the enumerated protections mandated by the clause at 1852.237-72, *Access to Sensitive Information*.

(c) (1) The Contractor shall identify any sensitive information submitted in support of this proposal or in performing this contract. For purposes of identifying sensitive information, the Contractor may, in addition to any other notice or legend otherwise required, use a notice similar to the following:

Mark the title page with the following legend:

This proposal or document includes sensitive information that NASA shall not disclose outside the Agency and its service providers that support management activities and administrative functions. To gain access to this sensitive information, a service provider's contract must contain the clause at NFS 1852.237-72, *Access to Sensitive Information*. Consistent with this clause, the service provider shall not duplicate, use, or disclose the information in whole or in part for any purpose other than to perform the services specified in its contract. This restriction does not limit the Government's right to use this information if it is obtained from another source without restriction. The information subject to this restriction is contained in pages [*insert page numbers or other identification of pages*]. Mark each page of sensitive information the Contractor wishes to restrict with the following legend:

Use or disclosure of sensitive information contained on this page is subject to the restriction on the title page of this proposal or document.

(2) The Contracting Officer shall evaluate the facts supporting any claim that particular information is "sensitive." This evaluation shall consider the time and resources necessary to protect the information in accordance with the detailed safeguards mandated by the clause at 1852.237-72, *Access to Sensitive Information*. However, unless the Contracting Officer decides, with the advice of Center counsel, that reasonable grounds exist to challenge the Contractor's claim that particular information is sensitive, NASA and its service providers and their employees shall comply with all of the safeguards contained in paragraph (d) of this clause.

(d) To receive access to sensitive information needed to assist NASA in accomplishing management activities and administrative functions, the service provider must be operating under

a contract that contains the clause at 1852.237-72, *Access to Sensitive Information*. This clause obligates the service provider to do the following:

(1) Comply with all specified procedures and obligations, including the Organizational Conflicts of Interest Avoidance Plan, which the contract has incorporated as a compliance document.

(2) Utilize any sensitive information coming into its possession only for the purpose of performing the services specified in its contract.

(3) Safeguard sensitive information coming into its possession from unauthorized use and disclosure.

(4) Allow access to sensitive information only to those employees that need it to perform services under its contract.

(5) Preclude access and disclosure of sensitive information to persons and entities outside of the service provider's organization.

(6) Train employees who may require access to sensitive information about their obligations to utilize it only to perform the services specified in its contract and to safeguard it from unauthorized use and disclosure.

(7) Obtain a written affirmation from each employee that he/she has received and will comply with training on the authorized uses and mandatory protections of sensitive information needed in performing this contract.

(8) Administer a monitoring process to ensure that employees comply with all reasonable security procedures, report any breaches to the Contracting Officer, and implement any necessary corrective actions.

(e) When the service provider will have primary responsibility for operating an information technology system for NASA that contains sensitive information, the service provider's contract shall include the clause at 1852.204-76, *Security Requirements for Unclassified Information Technology Resources*. The Security Requirements clause requires the service provider to implement an Information Technology Security Plan to protect information processed, stored, or transmitted from unauthorized access, alteration, disclosure, or use. Service provider personnel requiring privileged access or limited privileged access to these information technology systems are subject to screening using the standard National Agency Check (NAC) forms appropriate to the level of risk for adverse impact to NASA missions. The Contracting Officer may allow the service provider to conduct its own screening, provided the service provider employs substantially equivalent screening procedures.

(f) This clause does not affect NASA's responsibilities under the Freedom of Information Act.

(g) The Contractor shall insert this clause, including this paragraph (g), suitably modified to reflect

the relationship of the parties, in all subcontracts that may require the furnishing of sensitive information.

(End of Clause)

SECTION J. LIST OF DOCUMENTS, EXHIBITS, AND OTHER ATTACHMENTS

J.1 LIST OF ATTACHMENTS

The following documents are attached hereto and made a part of this contract:

Attachment	Document Revision Date
Attachment J-01, Integrated Crew Transportation System Requirements	July 7, 2014
Attachment J-02, Data Requirement Deliverables (DRDs)	July 7, 2014
Attachment J-03, Contract Performance Work Statement (PWS)	July 7, 2014
Attachment J-03, Appendix A, Milestone Acceptance Criteria and Payment Schedule	July 7, 2014
Attachment J-04, Small Business Subcontracting Plan	July 7, 2014
Attachment J-05, Glossary and Acronym List	July 7, 2014
Attachment J-06, Personal Identity Verification (PIV) Card Issuance Procedure	July 7, 2014

(End of Clause)

Attachment J-01

Integrated Crew Transportation System (CTS) Requirements

Requirements Documents

The documents listed in Table J01-1, *Commercial Crew Transportation Capability (CCtCap) Applicable Documents,* are applicable for this contract and provide the Crew Transportation System (CTS) requirements for the International Space Station (ISS) Design Reference Mission (DRM). Documents listed as applicable within the documents in Table J01-1 are also applicable documents for this contract. In addition, documents listed as reference within the documents in Table J01-1 are also reference documents for this contract, except for CCT-PLN-1120, *Crew Transportation Technical Management Processes*. Although CCT-PLN-1120 is listed as a reference document in CCT-REQ-1130, *ISS Crew Transportation and Services Requirements Document,* it is considered an applicable document for the contract. The applicable and reference documents are available at http://commercialcrew.nasa.gov/.

For the documents listed in Table J01-1, *Commercial Crew Transportation Capability (CCtCap) Applicable Documents*, the term "Commercial Provider" shall be construed to mean "Contractor".

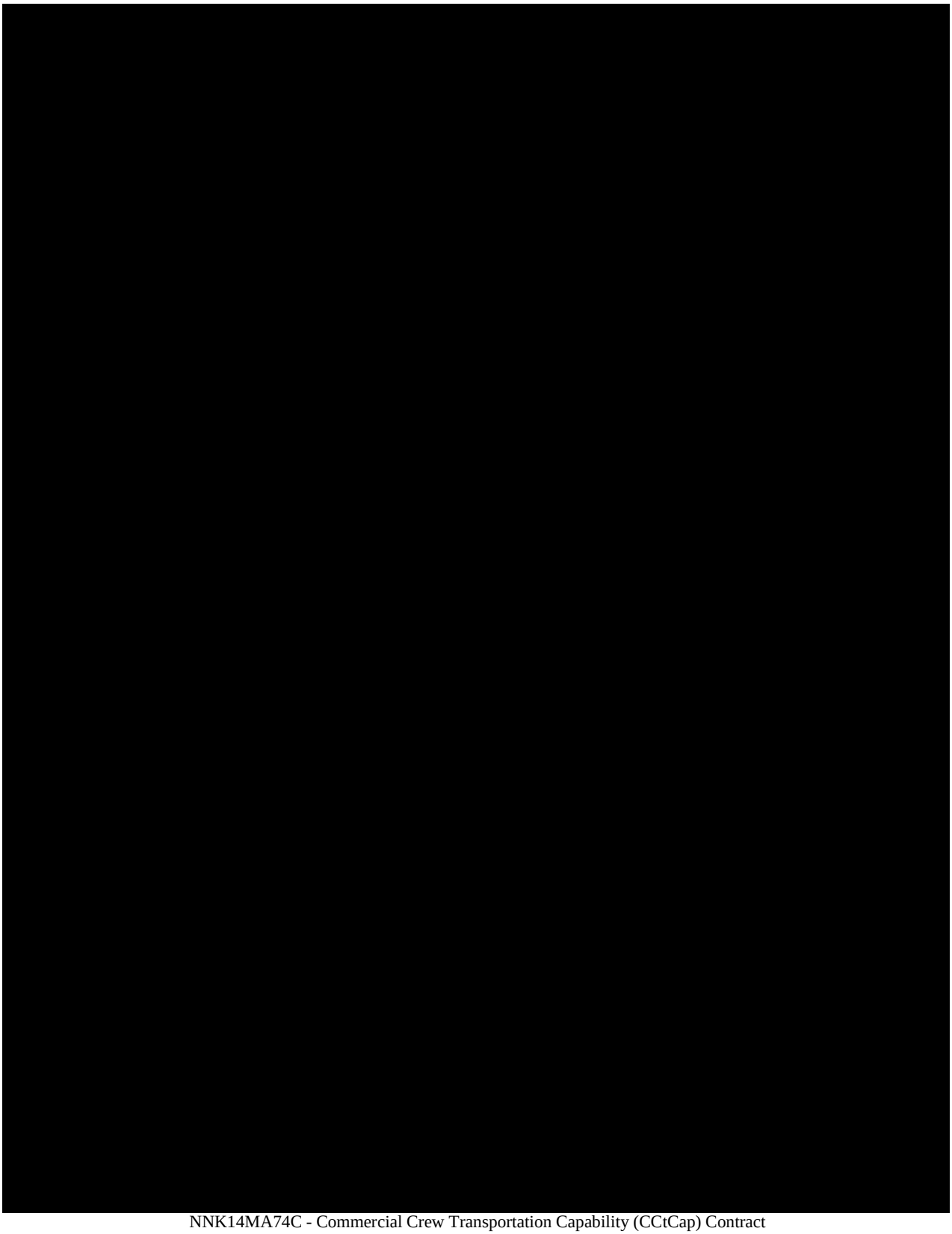
CCT-REQ-1130 Sections 4.0 through 4.3 establish verification requirements for the design requirements established in Section 3.0. NASA recognizes numerous methods exist to verify compliance to requirements and encourages the formulation of innovative verification requirements that satisfy the overall verification objectives. Once a specific contractor's verification plan is approved by NASA, the content of the plan will supersede the specific verification statements in section 4.3 of CCT-REQ-1130 and will be considered approved tailoring of the associated requirement.

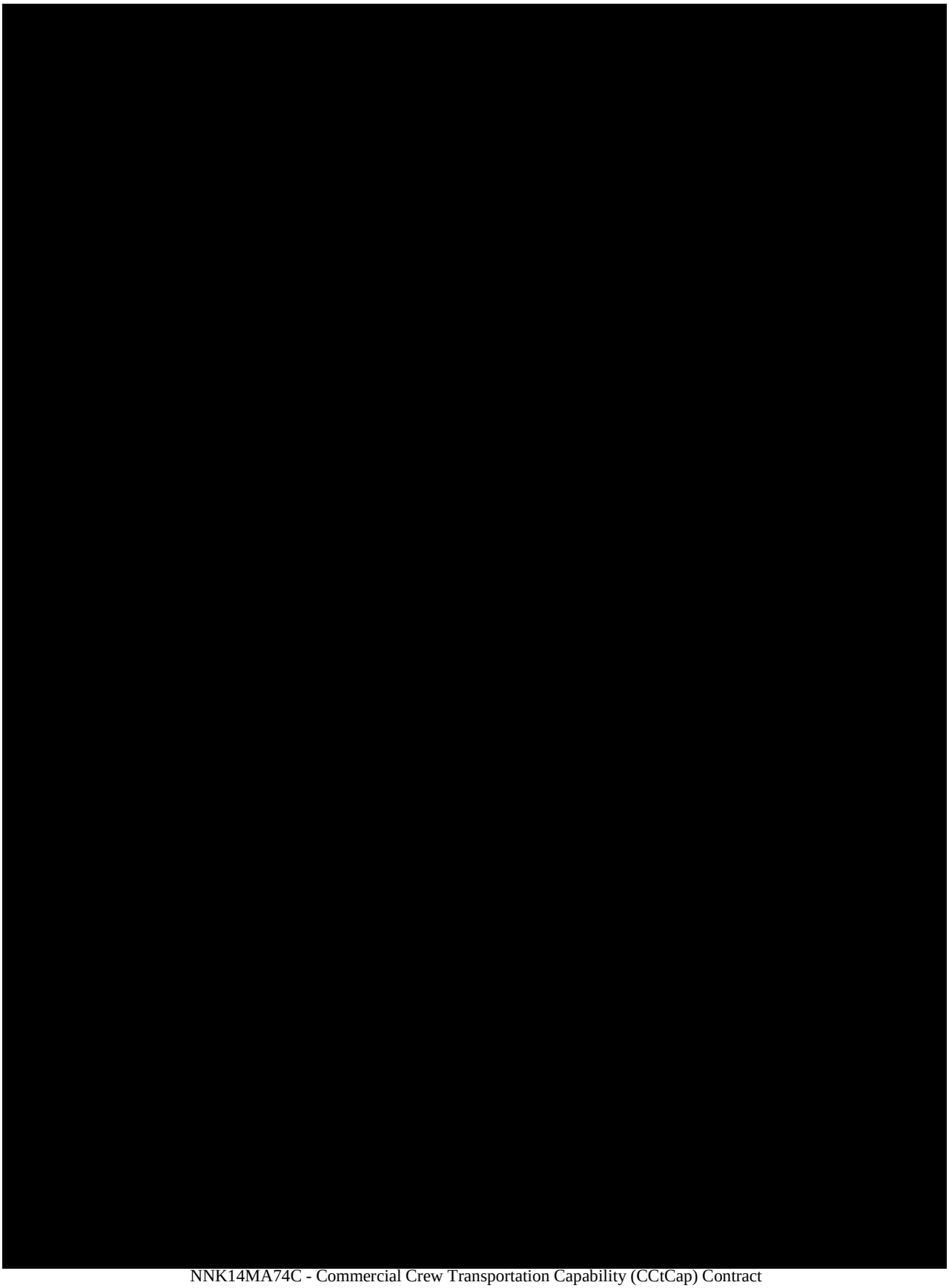
Table J01-1: Commercial Crew Transportation Capability (CCtCap) Applicable Documents

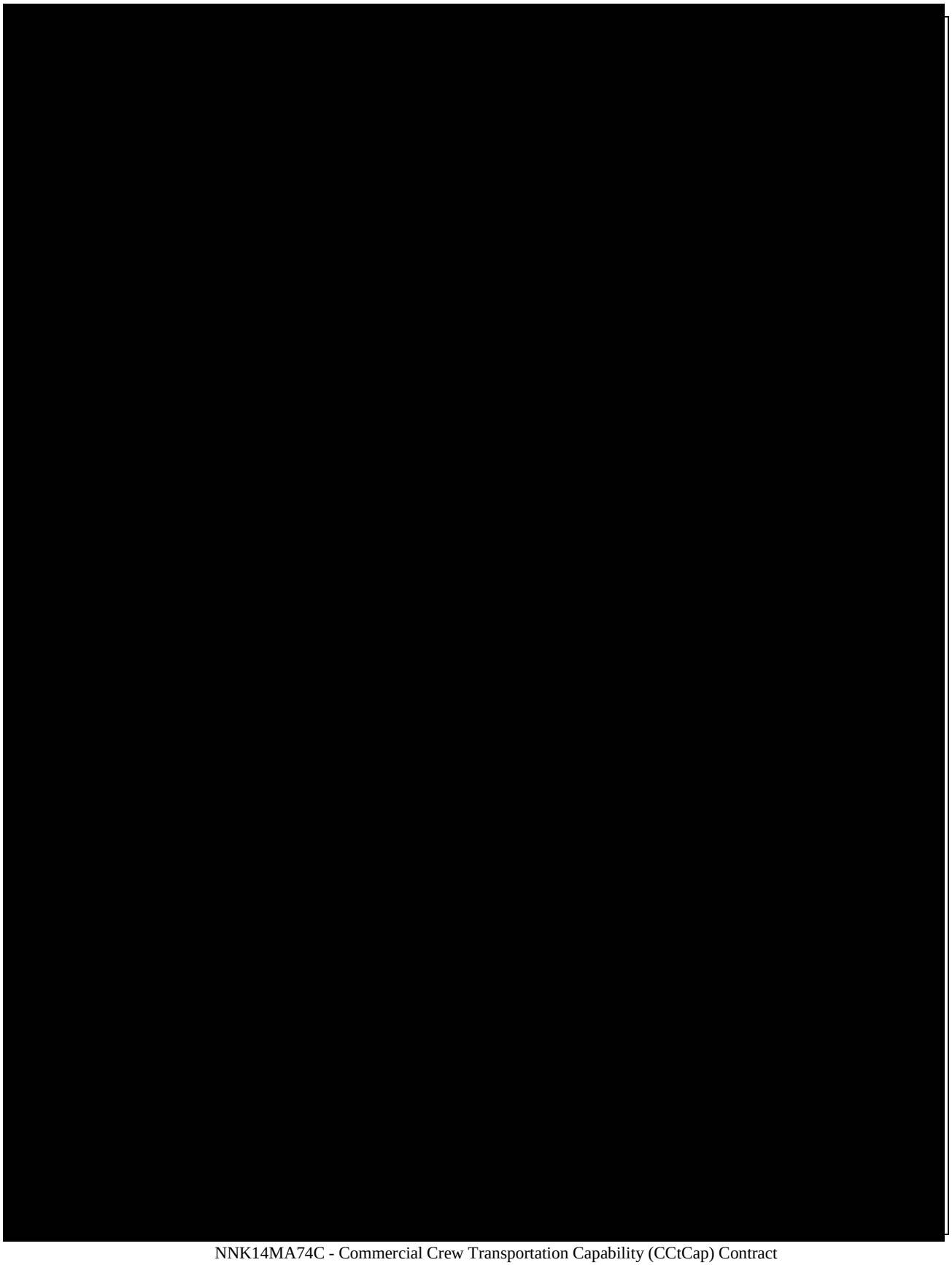
Document Number	Revision	Document Title
CCT-PLN-1100	B-1	Crew Transportation Plan
CCT-DRM-1110	Basic-1	Crew Transportation System Design Reference Missions
CCT-PLN-1120	C	Crew Transportation Technical Management Processes
CCT-REQ-1130	C	ISS Crew Transportation and Services Requirements Document
CCT-STD-1140	A-1	Crew Transportation Standards and Processes Criteria
CCT-STD-1150	A-1	Crew Transportation Operations Standards
SSP 50808	E plus DCN 0135B, 0146A, 0149, 0151, 0152, 0153	International Space Station (ISS) to Commercial Orbital Transportation Services (COTS) Interface Requirements Document (IRD)

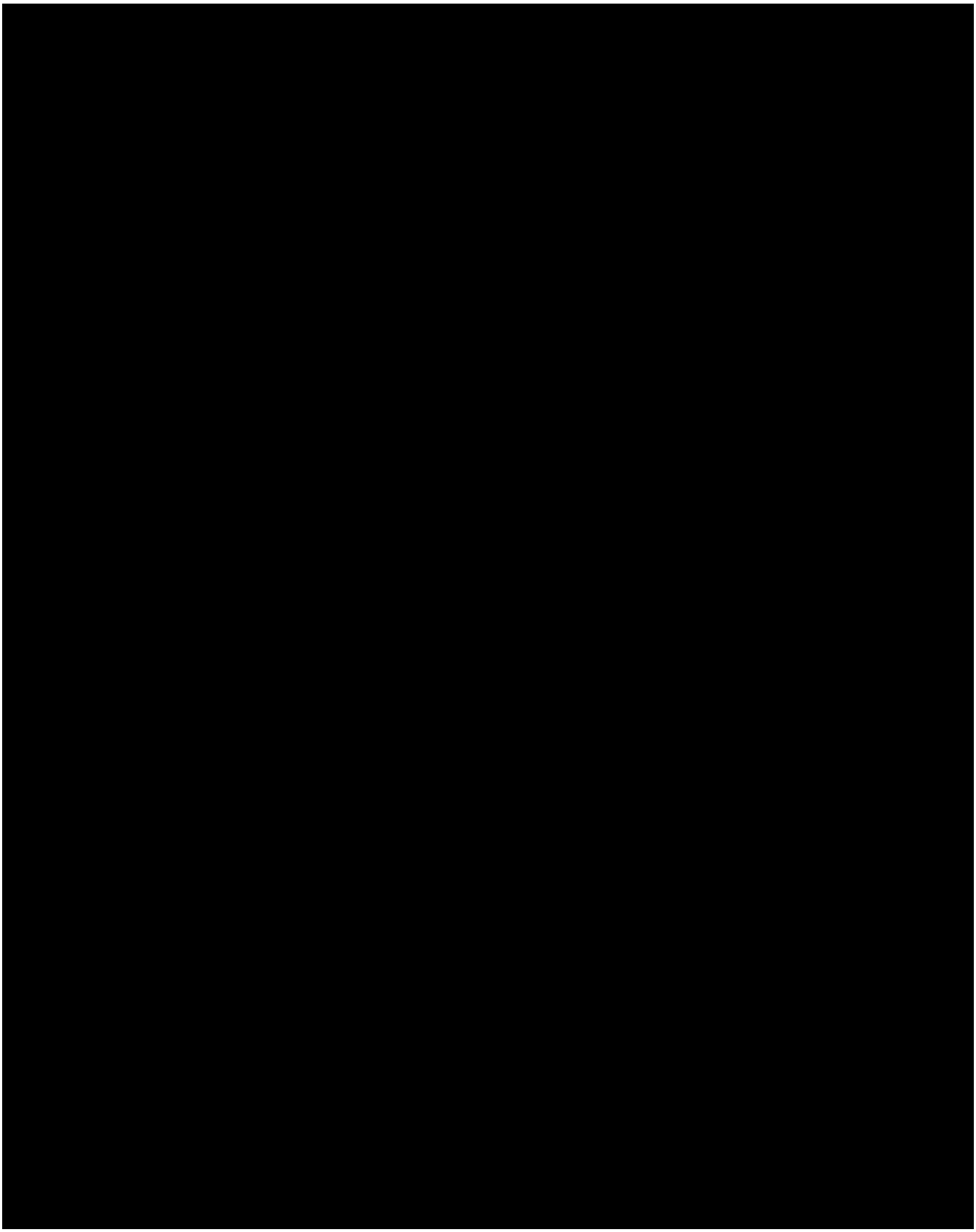
Variances and Alternate Standards, as described in Table J01-2,*CPC Appendix to Applicable Documents,* that were approved by NASA as part of Certification Products Contract (CPC) shall be incorporated as appendices to affected applicable documents.

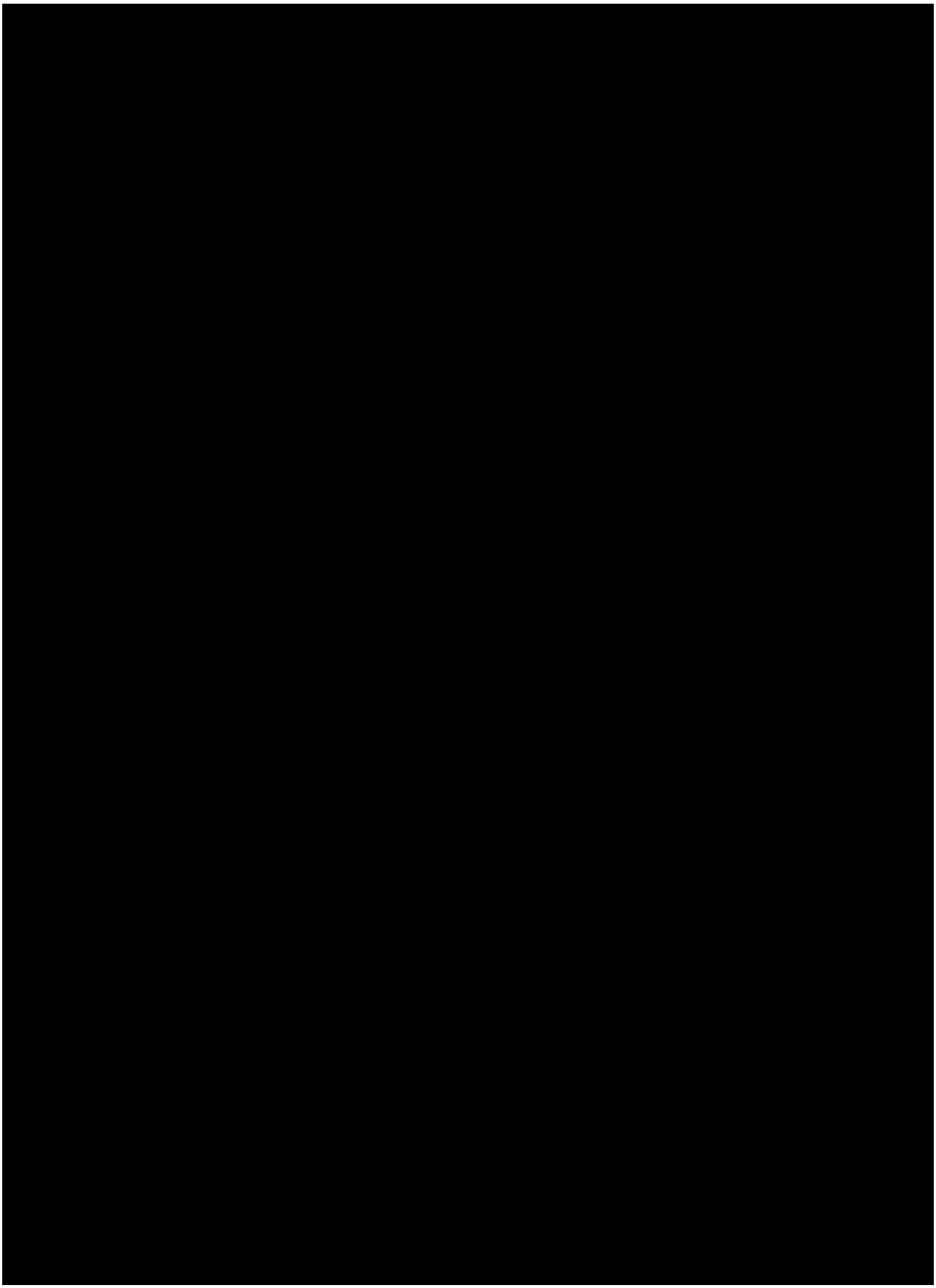
Table J01-2 CPC Appendix to Applicable Documents

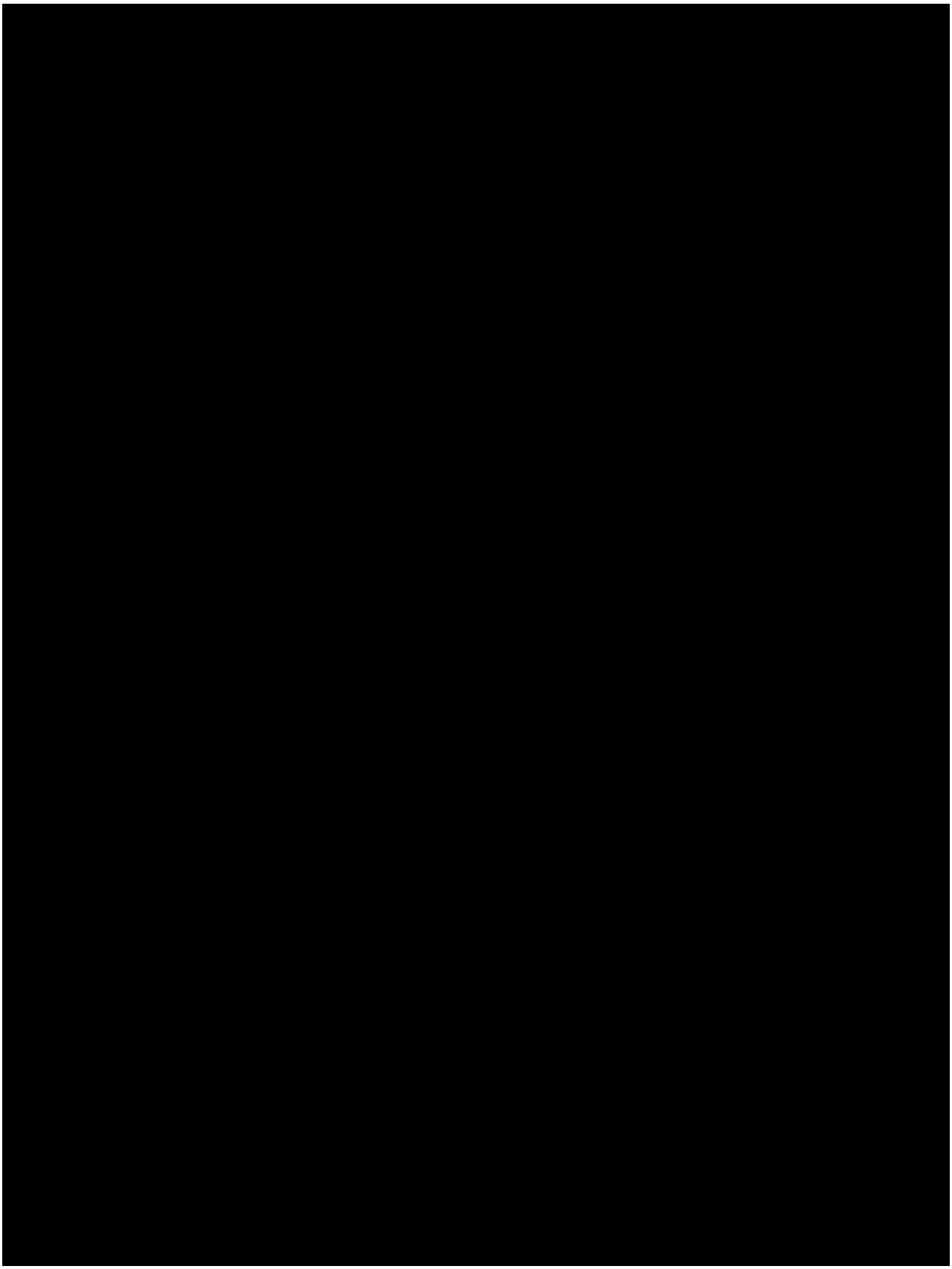


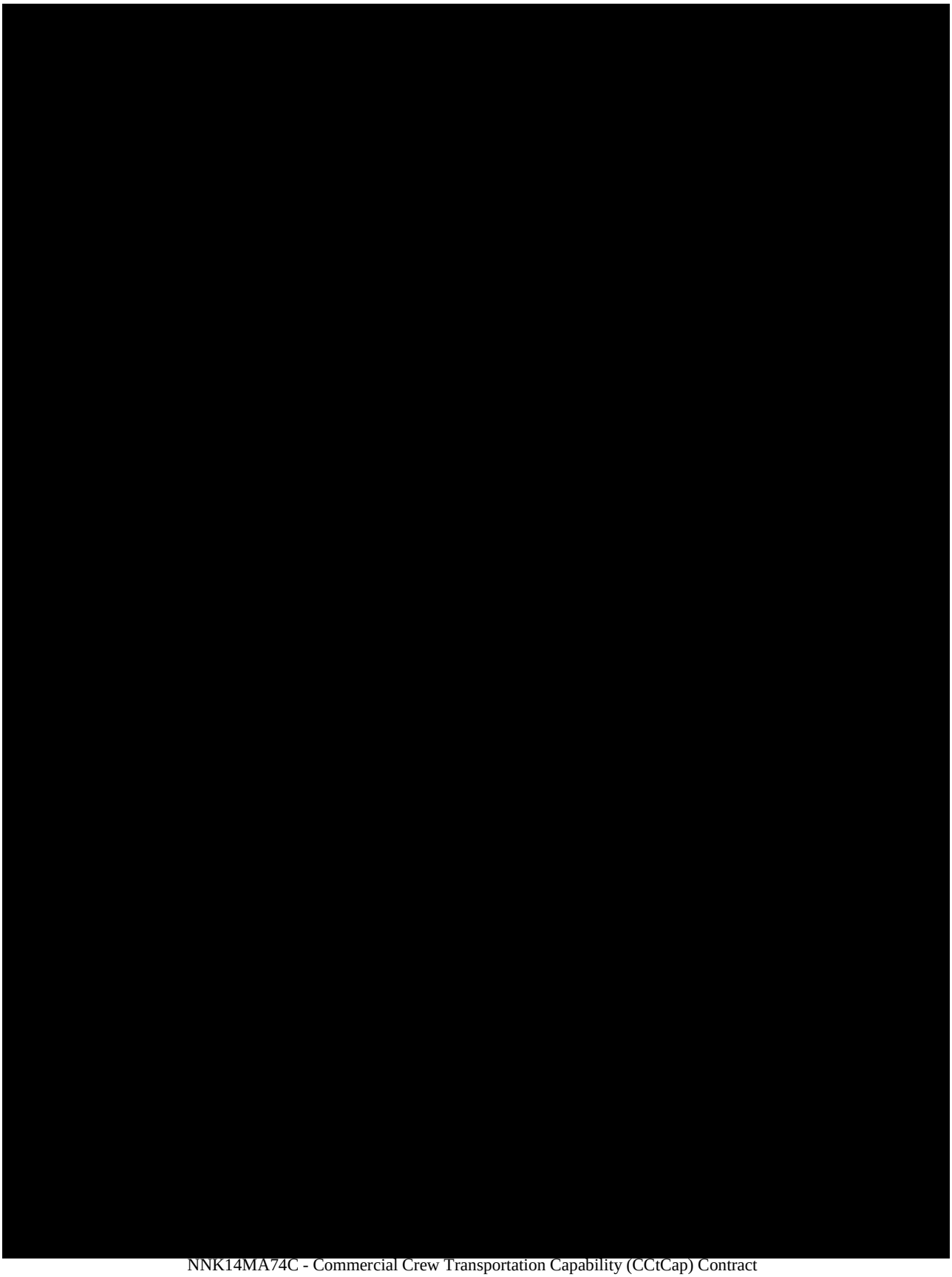


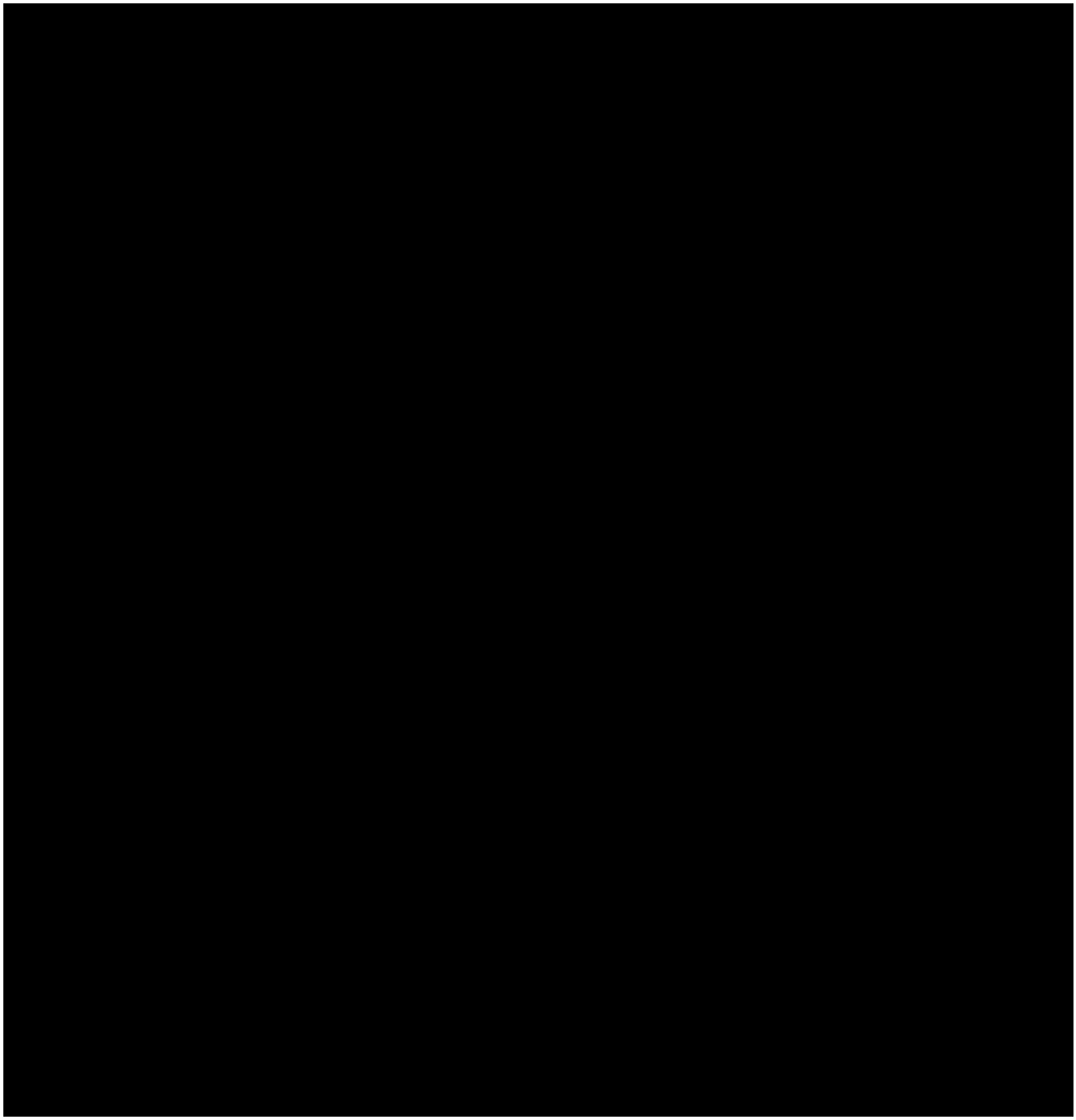












NNK14467515R

Commercial Crew Transportation Capability (CCtCap)

Performance Work Statement (Attachment J-03) Solicitation NNK14467515R

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INTRODUCTION

The purpose of the Commercial Crew Program (CCP) is to facilitate the development of a US commercial crew space transportation capability with the goal of achieving safe, reliable and cost- effective access to and from the International Space Station (ISS). The program includes spacecraft, launch vehicles, ground and mission systems.

NASA is using a two-phased acquisition to certify fully integrated crew transportation systems (CTS) that meet specified NASA safety and ISS requirements and standards, and begin missions to the ISS. Phase 1, the Certification Products Contract (CPC), requires delivery and disposition of specified early lifecycle plans and products that address CTS compliance with NASA's standards and requirements for an ISS design reference mission (DRM). The CPC deliverables mature in parallel with the CTS design. Phase 2, the Commercial Crew Transportation Capability (CCtCap) contract, includes the final design, development, test and evaluation (DDTE) activities necessary to achieve NASA certification of a CTS for the ISS DRM within CCT-DRM-1110. CCtCap culminates in NASA's certification of the CTS and the execution of post-certification missions (PCMs) transporting NASA crew to the ISS.

This Performance Work Statement (PWS) defines the work to be accomplished by SpaceX during CCtCap in support of certification of its CTS, the Dragon-Falcon 9 Crew System, and the performance of post-certification missions. SpaceX shall perform the services and deliver the products described in this PWS, in compliance with the contract terms and conditions and the requirements contained in the applicable documents, CTS Requirements, Data Requirements Descriptions (DRDs), and other plans and sections contained within the contract.

SCOPE

SpaceX shall complete the design, development, test, evaluation and certification of an integrated CTS capable of transporting NASA crew to and from the ISS, in accordance with the DRM and the certification standards and requirements specified in this contract under CLIN 001. The CTS is the collection of all space-based and ground-based systems (encompassing hardware and software) used to conduct space missions or support activity in space, including the integrated space vehicle (Dragon), space-based communication and navigation systems, launch systems (Falcon 9) and mission/launch control. Certification of the CTS shall be determined by NASA. SpaceX shall also provide complete, initial PCMs to and from the ISS including ground, launch, on-orbit, return and recovery operations, as ordered by IDIQ tasks under CLIN 002 of this contract. SpaceX shall provide special studies for risk reduction and other purposes related to its CTS, to the extent ordered under CLIN 003 of this contract.

SpaceX shall provide all facilities, resources, personnel, items or services necessary to perform the requirements specified in Section B, Supplies or Services and Prices/Costs (except for government-furnished property as listed in Clause G.6, NFS 1852.245-76, List Of Government Property Furnished Pursuant To FAR 52.245-1 and Government Furnished Services and Data as listed in Clause H.12) in accordance with the following:

- Attachment J-01, Integrated Crew Transportation System (CTS) Requirements.
- Attachment J-02, Data Requirement Deliverables (DRDs).
- Attachment J-03, Contract Performance Work Statement (PWS).
- Attachment J-03, Appendix A, Milestone Acceptance Criteria and Payment Schedule.

All CCtCap services require compliance with the governing regulations and laws affecting the procurement and execution of the contract. Compliance with applicable documents, CTS Requirements, and DRDs is mandatory. However, SpaceX's use of alternative means and methods to meet these is acceptable, provided the same level of rigor and stringency is preserved and their alternate use or variance is approved by NASA.

1 MANAGEMENT

In close cooperation with NASA, SpaceX shall define, manage and implement technical management plans and processes associated with achieving and maintaining NASA certification and executing post-certification missions throughout the CTS life cycle in accordance with CCT-PLN-1120, Crew Transportation Technical Management Processes. The execution of these processes will ensure that the CTS is developed, produced and operated in a repeatable manner throughout the life cycle of the system.

SpaceX shall identify and implement a process to determine and mitigate the CTS safety risk to the lowest achievable level throughout the lifecycle and clearly communicate to NASA all associated mitigations and residual safety risk.

[redacted]The following work statements under this Section 1, Management, are applicable to all CLINs related to this contract.

1.1 Government Insight and Technical Interaction

1.1.1 Government Insight

SpaceX and NASA shall establish and maintain cooperative relationships to facilitate successful NASA insight. The NASA insight team includes the Joint Test Team and Government Quality Assurance personnel as documented in the Insight Implementation Plan. NASA insight personnel shall be provided with timely notification and access to the full range of appropriate activities listed in CCT-PLN-1100, Appendix C, Insight Areas, as well as any additional activities listed in the Insight Implementation Plan.

SpaceX, through the insight team, shall give NASA electronic access to [redacted]. NASA insight personnel shall also have electronic access to [redacted]. SpaceX shall accommodate designated NASA insight personnel, including members of the Joint Test Team, [redacted].

This insight will provide NASA an understanding of SpaceX's activities and data through an effective working relationship, inspections and interactions, without approval or disapproval authority, and will provide information for the eventual certification approval.

The DRD 001 Insight Implementation Plan delivered with SpaceX's proposal is approved for use in performance of the contract until subsequent DRD delivery. SpaceX shall deliver and execute DRD 001 Insight Implementation Plan, in accordance with Clause H.15, Government Insight.

1.1.2 SpaceX - NASA Technical Interaction

SpaceX shall develop the operational products for mission planning and execution. For ISS integrated operations, SpaceX shall jointly develop with NASA the operational products and mission planning and joint execution.

SpaceX shall jointly develop with NASA a crew training template for CTS and ISS training (Reference DA8-13-193, Notional Training Template for ISS Crewmembers, dated October 31, 2013).

SpaceX shall develop and deliver data in accordance with DRD 114 Crew Transportation System (CTS) Data Input for NASA Integration and Independent Verification and Validation (IV&V).

SpaceX shall provide technical expertise and participate:

(a) In NASA evaluation and review of performance milestone deliverables at NASA Commercial Crew Program (CCP) Program Boards as defined in CCT-PLN-1000, Crew Transportation Plan. In support of issues related to Crew Transportation System (CTS) Certification, SpaceX may attend and support NASA Program Boards, as invited. SpaceX may also request a NASA Program Board to be convened in support of issues related to CTS Certification.
(b) In Operational forums (e.g. Joint Operations Panel (JOP) and Flight Operations Review (FOR)) to support the analyses and data delivered to NASA for the development of joint NASA operations products, analyses and tools.
(c) In Visiting Vehicle Integration Manager (VVIM) forums for joint development of ISS integration products and execution of joint processes.
(d) In NASA Independent Verification and Validation (IV&V) activities.
(e) In the Integrated Safety Review Process defined in CCT-PLN-1120, Crew Transportation Technical Management Processes. SpaceX's participation shall include technical expertise in support of Phase Safety Reviews of Hazard Reports. The end goal of each Phase Safety Review is for the safety analysis to achieve the relevant Phase II or III approval from NASA, resulting in a product that meets the criteria in SSP 30599 and can be delivered in accordance with DRD 110 Hazard Reports.
(f) In NASA/FAA/Range trilateral discussions representing their recommendations when crew safety and public safety risk considerations are assessed.

1.2 Program Management

SpaceX shall maintain and comply with the management processes, systems and data deliverables used for all contract CLINs throughout the life of the contract.

SpaceX shall follow the applicable standards, documents, requirements and processes as specified in Attachment J-01 Integrated Crew Transportation System (CTS), Table J01-1 and Table J01-2.

SpaceX shall document its project management process in a Project Management Plan in accordance with CCT-PLN-1120.

SpaceX shall maintain current DRDs and data deliverables as specified in Attachment J-02 Data Requirement Deliverables (DRDs).

SpaceX shall perform the following program management activities to meet mission objectives:

- System architecture definition.
- System design.
- System performance.
    - System technical baseline definition and maintenance.
- Capability validation.
- Risk/issue management.
- Integration and test.
- Interface management.
- Customer requirements verification.
- Tracking and reporting of contract performance.

1.2.1 Milestones, ISS Integration and Certification

The DRD 101 Milestone Review Plan delivered with SpaceX's proposal is approved for use in performance of the contract until subsequent DRD delivery.

SpaceX shall perform ISS integration in accordance with the intent of SSP 50964, Visiting Vehicle ISS Integration Plan.

SpaceX shall deliver and implement all plans listed in CCT-PLN-1120, Crew Transportation Technical Management Processes.

1.2.2 Performance and Progress Management

SpaceX shall conduct Quarterly Program Reviews (QPRs) with NASA and shall develop and deliver DRD 005 Quarterly Program Review Briefing Package prior to every QPR. The reviews shall provide insight into SpaceX's overall technical progress, schedule status, cost assessment, and plans forward.

SpaceX shall develop and deliver an Integrated Master Plan/Integrated Master Schedule in accordance with DRD 002 Integrated Master Plan & Integrated Master Schedule. SpaceX shall manage the execution of the program using the IMP/IMS. SpaceX shall report on the contract

progress in accordance with the IMP at each QPR. SpaceX shall provide NASA with monthly updates to the IMS following the monthly schedule review meeting conducted by SpaceX.

1.2.3 Information and Security Management

SpaceX shall develop and deliver DRD 003 Information Technology (IT) Security Management Plan and DRD 004 IT Security Plan in accordance with Clause I.2 NFS 1852.204-76, Security Requirements for Unclassified Information Technology Resources.

SpaceX shall develop and deliver an Export Control Plan in accordance with DRD 006 Export Control Plan.

1.2.4 Risk Management

SpaceX shall employ measures to maximize safety and protect the public, crew, personnel and property.

SpaceX shall identify, evaluate, manage and control the safety, technical, cost and schedule related risks throughout the CCtCap contract. SpaceX shall identify and address risks early enough to allow adequate time to develop and implement mitigations, thereby reducing both the likelihood a risk will occur and the cost of mitigation.

SpaceX shall manage risks in accordance with the SpaceX Risk Management Plan, which is consistent with NPR 8000.4A and CCT-PLN-1120 requirements.

Before each flight SpaceX shall ensure that:

- Risks are mitigated or accepted.
- Issues are dispositioned and accepted.
- [redacted]
- Procedures are reviewed and baselined.
- Corrective actions are completed.

1.2.5 Safety and Mission Assurance

[redacted]

SpaceX shall complete analyses in compliance with CCT-PLN-1120 to meet all requirements in CCT-REQ-1130 and SSP 50808. To meet these requirements SpaceX shall complete at a minimum:

- Failure modes, effects and criticality analysis.

- Hazard analysis.
- Probabilistic safety analysis.
- Software safety analysis.

SpaceX shall comply with all applicable Range requirements and deliver DRD 113 Range Safety Documentation.

SpaceX shall conduct a crew survivability analysis for all mission phases in accordance with CCT-PLN-1120.

1.2.6 Systems Engineering and Configuration Management

SpaceX shall perform all the basic components of systems engineering—including requirements analysis and verification, design environments specification and certification, interface control, integrated test and verification, design control, configuration management, risk management, and problem reporting and corrective action.

- **Requirements Management** – SpaceX shall track requirements in [redacted], a requirements management tool. ReqX shall track and trace all requirements in CCT-REQ-1130 and SSP 50808.
- **Verification** – SpaceX shall deliver and implement a Verification and Validation (V&V) Plan in accordance with DRD 108 Verification and Validation (V&V) Plan and CCT-PLN-1120. This plan shall detail the approaches for verifying requirement compliance. As relevant to specific requirements, the event descriptions in the plan shall also contain verification and validation of manufacturing operations, hardware and software qualification and acceptance testing programs, environmental testing, and validation of models and simulations. The plan shall address all requirements from SSP 50808 and CCT-REQ-1130. SpaceX shall deliver verification closure notices in accordance with DRD 111 Verification Closure Notices (VCN).
- **CCtCap Design and Engineering Review Process** – SpaceX shall follow a formal review process during CCtCap as shown in the milestones in Attachment J-03, Appendix A. This design review process shall be implemented as described in the Milestone Review Plan (DRD 101).
- **Configuration Management** - SpaceX shall implement configuration control processes in accordance with the SpaceX Configuration Management Plan, which meets AS9100C quality system requirements. The Configuration Management Plan shall ensure the configuration of all data products, regardless of their source location, is effectively managed with respect to each mission those data products are used within.
- **Design Change Management** - SpaceX shall manage the change process using a formal system for documenting, analyzing, discussing and approving proposed changes to all elements of SpaceX vehicles and elements directly interfacing with the vehicle, [redacted] SpaceX shall deliver

information to NASA regarding any change that has an impact on NASA contract requirements, hazard reports, vehicle performance or NASA certification via [redacted].

- **Performance Margins** – SpaceX shall track key vehicle budgets, performance parameters and performance margins.

1.2.7 Mission Assurance, Inspection and Surveillance

SpaceX shall use a comprehensive approach to mission assurance, inspection and surveillance that is based on disciplined use of documented processes. [redacted] SpaceX shall maintain a Quality Management System that documents the controls and systems used for the design and development of hardware and software, supply chain management, manufacturing, assembly, integration, test, and operations. SpaceX also shall maintain a Quality Assurance Plan that documents the processes and procedures used to meet contract requirements and support the consistent delivery of high-quality, professional products and services.

1.2.8 Management of Launch Slots and Launch Windows

[redacted]

1.3 Lifecycle Cost Management

SpaceX shall conduct Quarterly Program Reviews (QPRs) with NASA and shall develop and deliver DRD 005 Quarterly Program Review Briefing Package [redacted] every QPR. The reviews shall provide insight into SpaceX's overall technical progress, schedule status, cost assessment and forward plans.

2 DESIGN, DEVELOPMENT, TEST AND EVALUATION (DDTE)/ CERTIFICATION OF THE COMMERCIAL CREW TRANSPORTATION SYSTEM (CTS) (CLIN 001)

SpaceX shall obtain NASA certification of a CTS that meets or exceeds the requirements in CCT-REQ-1130 and SSP 50808. SpaceX shall demonstrate compliance to the technical requirements by designing, developing, testing and evaluating an end-to-end system culminating in an agency review for approval to grant NASA certification. SpaceX shall establish a comprehensive development plan and approach, documented in DRDs 107, 108, and 109, that encompasses all effort necessary to achieve NASA certification of the CTS.

SpaceX shall implement the development plan, products, processes and schedule that support NASA certification and ISS integration.

SpaceX shall establish and utilize design, production, and operations standards that result in safe, reliable and usable end items and integrated system.

SpaceX shall produce a CTS such that each flight article and ground article, including software, is manufactured, assembled, and integrated in a repeatable manner that satisfies both SpaceX and NASA requirements.

SpaceX shall conform to NASA's standard requirements for operational planning, operational controls, training, and mission execution documented in CCT-STD-1150, SSP 50808, and other applicable documents listed in Table J01-1.

SpaceX shall operate a CTS such that execution of the flight tests and PCMs is within the constraints of the NASA certification and recurring ISS requirements. SpaceX planning activity is based on an assumed flight rate of two (2) flights per year to the ISS.

2.1 Design, Development, Test and Evaluation (DDT&E)

The major elements of DDT&E include the crew vehicle (Dragon), launch vehicle (Falcon 9), ground systems and operations, and mission systems and operations. These elements comprise the collection of all space-based and ground-based systems (encompassing hardware and software) used to conduct space missions or support activity in space.

2.1.1 Crew Vehicle – Dragon

SpaceX shall design, develop, test, evaluate and certify a Crew Dragon spacecraft that satisfies requirements in CCT-REQ-1130 and SSP 50808. The Dragon shall be capable of carrying out the DRM described in CCT-DRM-1110.

2.1.1.1 Dragon DDTE Activities

SpaceX shall perform the tasks required to design, develop, produce, test, and certify the Crew Dragon. Activities to be performed include the following:

Structural development and qualification, including:

- Secondary structure qualification (crew seats and restraints, hatches, propulsion mounting brackets).
- Thermal protection system qualification.
- Micrometeoroid and orbital debris (MMOD) protection design, testing and analysis.
- Mechanism qualification, including:
  - [redacted].
- Parachute qualification including margins in off-nominal conditions per testing requirements of JSC-65985.

- Propulsion system development and qualification, including:
  - [redacted]
- Thermal control system (TCS) development and qualification, including:
  - [redacted]
- Environmental control and life support system (ECLSS) development and qualification, including:
  - [redacted]



- Avionics system development and qualification, including:



- Guidance, navigation, and control (GNC) systems development and verification, including:



- Dynamics development and verification.

- Flight software development and verification.

2.1.2 Launch Vehicle – Falcon 9

SpaceX shall modify the Falcon 9 system to provide all capabilities required for crew missions and to meet the requirements called out in CCT-REQ-1130, as necessary. All modifications shall be designed, developed, tested, evaluated and reviewed with NASA prior to the Design Certification Review

- [redacted]

[redacted] Postflight data reviews shall be performed and postflight reports, including comparisons of model predictions to flight performance, shall be delivered to NASA for all CCtCap test flights and PCMs.

2.1.2.1 Falcon 9 DDTE Activities

Falcon 9 and the Crew Dragon shall perform as an integrated space vehicle from crew ingress through separation of the Crew Dragon vehicle. The safe and reliable operation of this integrated vehicle will be the focus of SpaceX's Falcon 9 DDTE activities. These activities shall include the following:

[redacted]

[redacted]

2.1.3 Ground Systems and Operations

SpaceX shall provide all required assembly, integration, testing, transportation, storage and processing for the CTS for launch and post-landing operations. These activities include the planning, pre-launch processing, launch, and post-landing operations.

SpaceX shall build, integrate and test the Crew Dragon and Falcon 9 systems [redacted]

The production of the Crew Dragon and Falcon 9 shall occur on [redacted]

SpaceX shall modify launch pads and ground support facilities as required for crew operations. To accommodate the Crew Dragon configuration, the major upgrades to existing ground operations shall include the following:

[redacted]

SpaceX shall ensure operational safety as documented in the Falcon 9 System Safety Program Plan, Falcon 9 Ground Operations Plan, and Missile Systems Pre-Launch Safety Package.

SpaceX shall conform to all applicable Range requirements along with NPR 8715.5A, Range Safety Flight Safety Program, and deliver DRD 113 Range Safety Documentation.

2.1.3.1 Ground Operations DDTE Activities

The safe, reliable and repeatable operation of the facilities, ground systems and operations supporting the launch of Crew Dragon and the integrated vehicle will be the focus of SpaceX's ground operations DDTE activities. These activities shall include the following:

- Production facility additions:

[redacted]

- Engine and structural test facility additions and test practices shall include:
- Adapt Launch Complex 39A systems for CTS launches, including:
- Modify/develop existing Falcon 9 systems for use at Launch Complex 39A, including:
- Augment Launch Control capabilities, including:
- Evaluate and update countdown processes and launch commit criteria, including:
- Develop training for ground operations personnel.

2.1.4 Mission Systems and Operations

Mission Operations encompasses flight operations from launch through landing and recovery. SpaceX's

Each Mission Operations team (Mission Operations, Flight Crew Operations, Training and Simulation, Ground Segment, Ground Software, and Recovery) is expected to achieve key developments during the CCtCap program. The ability to safely and successfully complete crew missions will be the focus of SpaceX's Mission Operations DDTE activities. These activities shall include the efforts and events described in the following subsections.

2.1.4.1 Mission Operations Development

SpaceX shall perform modifications to the existing Mission Operations system to accommodate the Crew Vehicle concept of operations. The major activities shall include the following:

- Present the end-to-end mature operations design and developed under CCiCap in the Delta-CDR, including detailed concept of operations and mission timeline.
- Develop and document a full set of operations policies, practices and processes for crew missions. SpaceX shall work with the NASA Joint Test Team to develop ground and crew procedures [redacted] The final procedures shall cover nominal, contingency and emergency scenarios.
- Develop joint operations products (e.g., flight rules, operations interface procedures, coordination tables) in collaboration with NASA to cover every phase of flight.
- Upgrade the design and layout of the Mission Control center and Launch Control center and add additional console positions needed to support crew.
- Perform all necessary planning, analysis, testing and coordination to prepare for each of the flight tests and PCMs.
- Plan and execute joint mission simulations to validate architecture.

2.1.4.2 Flight Crew Operations Development

SpaceX shall develop Flight Crew Operations to accommodate the Crew Vehicle concept of operations. The major activities shall include the following:

- Complete detailed task analysis.
- Develop crew-specific and joint crew-ground procedures, voice protocols, and crew roles covering nominal and contingency scenarios for every mission phase.
- Engage in formal evaluations, testing and delivery for all crew provisions and emergency kit items.
- Design, build, test and evaluate the crew displays and controls in an iterative manner with NASA Joint Test Team participation.
- Evaluate manual control handling with NASA Joint Test Team participation.

NASA Joint Test Team personnel will participate in crew-in-the-loop planning, development, and evaluation activities, not just the ones explicitly mentioned above.

2.1.4.3 Training and Simulation Development

SpaceX shall perform modifications and development for Training and Simulation to accommodate the Crew Vehicle concept of operations. The major updates and activities shall include the following:

- [redacted]
- Develop a complete set of supporting training material for the remaining ground operators.
- Develop a complete set of supporting training material for the crew training plan including a detailed crew training schedule that accommodates other ISS assigned crew member training requirements.
- [redacted]
- [redacted]
- Augment the operator certification database to accommodate the internal requirements for crew missions, both for ground operators and crew members.
- Train and certify individual operators and full operator shifts for the CCtCap test flights and PCMs. [redacted]
- Train and certify the crew aboard the ISS for each CCtCap test flight and PCM mission with regard to docking, cargo, and undocking operations. [redacted]
- Train and certify flight crews for each CCtCap test flight and PCM. [redacted]
- [redacted].
- Participate in two (2) mission management simulations for the first crewed flight to ISS that includes mission management, flight controllers and crew participation. NASA will conduct the simulations from the NASA-Johnson Space Center (JSC) Mission Control Center (MCC) and the ISS Management Center (IMC). Each of these simulations may last up to forty-eight (48) hours.

2.1.4.4 Ground Segment Development

SpaceX shall perform modifications to the existing Dragon-Falcon 9 ground segment to accommodate the Crew Vehicle concept of operations. The major upgrades and activities shall include the following:

- [redacted]
- Assess and upgrade ground station network to meet CTS requirements.
- [redacted]
- Conduct compatibility tests, including command and telemetry, between Dragon systems and both TDRSS and ground stations.
- [redacted]
- Conduct end-to-end verification testing.

2.1.4.5 Ground Software Development

SpaceX shall perform modifications to the existing Dragon-Falcon 9 ground software to accommodate the Crew Vehicle concept of operations. The major upgrades and activities shall include the following:

- [redacted]
- Conduct end-to-end verification testing.

2.1.4.6 Recovery Development

SpaceX shall perform modifications to the existing Dragon-Falcon 9 recovery operations to accommodate the Crew Dragon concept of operations. The major upgrades and activities shall include the following:

- [redacted]
- Select supported land landing sites, which in combination shall provide at least [redacted] entry and landing availability on any given day, on average, due to weather limitations based on historical data collected from 2004 to 2013 from weather stations nearest the sites.

- [redacted]
- Develop procedures and conduct analysis to govern land-based spacecraft landings and recovery through the deorbit, entry, descent, landing and post-landing phases including response to contingencies at supported landing sites.
- Evaluate and design custom GSE where necessary to facilitate and optimize critical operations of crew recovery.
- Provide GSE, including communication equipment, recovery vehicles, [redacted]
- [redacted] the necessary assets to execute safe recovery operations. SpaceX shall meet all mission safety requirements, including providing paramedic and firefighting personnel support.
- Validate procedures and analysis (both nominal and contingency) on recovery hardware though testing, simulations, demonstrations, and training.

Search and Rescue Coordination

- SpaceX shall coordinate and work with Detachment-3 (Det-3), 45th Operations Group, US Air Force to cover all search and rescue operations related to the Crew Vehicle.
- SpaceX and Det-3 shall iterate to complete detailed procedures, design rescue hardware, develop hands-on experience with the vehicle, and prepare for contingency scenarios.
- [redacted]
- SpaceX shall provide the information, lessons learned in previous experience, equipment, tools, and training to Det-3 in order to ensure the proper contingency support capability is prepared for each mission.
- [redacted]
- To facilitate crew rescue, the Dragon capsule shall provide its GPS location and include visual aids for search and rescue forces.
- SpaceX shall provide training for the operation and include a combination of briefings, and hands-on familiarization. Demonstrations using flight-like articles shall be performed.

2.1.5 Interim Development Milestones

SpaceX shall perform the following milestones and associated DRD data package deliveries in compliance with Attachment J-03, Appendix A, Milestone Acceptance Criteria and Payment Schedule.

SpaceX shall deliver and implement a Milestone Review Plan in accordance with DRD 101 Milestone Review Plan. DRD 101 Milestone Review Plan delivered with Contractor's proposal is approved for use in performance of the contract until subsequent DRD delivery.

- Certification Baseline Review (CBR)
  SpaceX shall deliver the data described in DRD 102 Certification Baseline Review (CBR) Data Package in support of the Certification Baseline Review (CBR).

  SpaceX shall deliver and implement a Flight Test Plan in accordance with DRD 109 Flight Test Plan.

  SpaceX shall deliver the other DRD data packages associated with CBR as set forth in Attachment J-03, Appendix A, Milestone Acceptance Criteria and Payment Schedule.

- Design Certification Review (DCR).
  - DCR Interim Payment Milestones.
    - Initial Propulsion Module Testing Complete.
    - Avionics Test Bed Activation.
    - Delta Critical Design Review (dCDR).
    - Docking System Qualification Testing Complete.
    - Propulsive Land Landing Test Complete.
    - Launch Site Operational Readiness Review.
    - Flight Test Without Crew Certification Review.
    - ECLSS Integrated Test Complete.
    - Flight to ISS without Crew.
    - Parachute Qualification Complete.
    - Space Suit Qualification Testing Complete.
    - Launch Site Operational Readiness Review for Crew.
  - Formal change management shall be enforced for all vehicle components, subsystems, and systems at the conclusion of the Delta Critical Design Review Milestone, at the latest.

  SpaceX shall deliver the data described in DRD 103 Design Certification Review (DCR) Data Package in support of the Design Certification Review.

  SpaceX shall deliver a Certification Data Package in accordance with DRD 112 Certification Data Package.

  SpaceX shall deliver and implement a Certification Plan in accordance DRD 107 Certification Plan.

- Flight Test Readiness Review (FTRR)

SpaceX shall deliver the data described in DRD 104 Flight Test Readiness Review (FTRR) Data Package in support of the Flight Test Readiness Review.

- Operations Readiness Review (ORR) Activities

  SpaceX shall deliver the data described in DRD 105 Operations Readiness Review (ORR) Data Package in support of the Operations Readiness Review (ORR).

- Certification Review (CR) Milestone
  - CR Interim Payment Milestones.
    - Flight to ISS with Crew.

  SpaceX shall deliver the data described in DRD 106 Certification Review (CR) Milestone Data Package in support of the Certification Review (CR).

2.1.6 Approach to Docking with the ISS

[redacted]

2.1.6.1 Docking System Certification Approach

SpaceX shall perform Docking Certification activities as required for crew operations, including the following:

- Conduct acceptance testing at the lowest functional levels on all elements.
- [redacted]
- Certify the Dragon Docking System prior to the Flight to ISS without Crew milestone.

[redacted]

SpaceX shall not require NASA to perform any docking system certification work for any SpaceX-specific application.

2.2 ISS Integration

SpaceX shall perform ISS integration in accordance with the intent of SSP 50964, Visiting Vehicle ISS Integration Plan.

SpaceX shall deliver CTS hazard reports in accordance with DRD 110 Hazard Reports. SpaceX shall present the hazard analysis to NASA ISS SRP and the CCP STRB in order to complete the phased safety review in accordance with SSP 30599. The phased safety review is complete after NASA approval of all hazard reports and completion of all verification items.

SpaceX shall deliver and implement a Certification Plan in accordance DRD 107 Certification Plan.

SpaceX shall deliver and implement a Verification and Validation (V&V) Plan in accordance with DRD 108 Verification and Validation (V&V) Plan.

SpaceX shall deliver verification closure notices in accordance with DRD 111 Verification Closure Notices (VCN)

Flight operations products relevant to the Flight to ISS without Crew milestone shall be delivered to support ISS integration and FOR, and shall include appropriate flight procedures, operations timelines, flight rules and training syllabi in accordance with CCT-STD-1150. Additional crew-specific flight operations products shall be delivered for ISS integration prior to the Flight to the ISS with Crew mission.

[redacted]



2.3 Flight Tests

SpaceX shall execute two end-to-end flight tests during the DDTE and certification phase. The first flight test, a flight to ISS without crew, is an uncrewed mission to the ISS using the Crew Dragon-Falcon 9 system. The second flight test, a flight to ISS with crew, is a crewed mission to the ISS using the Crew Dragon-Falcon 9 system. As set forth below, SpaceX shall make applicable work statements from CLIN 002, Post Certification Missions, that are applicable to any crewed flight test(s).

2.3.1 Mission Planning Management and Execution

SpaceX shall perform mission planning, management and execution activities related to the flight tests. Mission planning, management and execution includes the plans, processes, schedules, reviews and products required to perform the flight design, analyses, and flight planning activities; flight products and procedure development; and execution of the two flight tests. SpaceX shall deliver DRD 201 Mission Integration and Operations Management Plan (MIOMP). This document outlines the overall approach to managing and executing Crew Dragon-Falcon 9 missions to the ISS. The Baseline MIOMP shall be submitted as a formal deliverable 45 days prior to the Certification Baseline Review (CBR). SpaceX shall deliver updated MIOMPs as required and the Final MIOMP no later than 12 months prior to the Flight Test without Crew.

2.3.2 Mission Milestones

SpaceX shall complete the mission milestones as defined below for both of the flight tests. All milestones and associated DRDs shall be planned and tracked in the Integrated Master Schedule (IMS).

- **Post Qualification Review (PQR) –** At approximately 4 months prior to each of the flight tests, SpaceX shall complete ISS Integration and participate in the PQR.
- **ISS Stage Operational Readiness Review (SORR) –** At approximately three (3) weeks prior to launch (L-3 wk.), SpaceX shall participate in the ISS SORR and provide, at a minimum, the following via data and presentation:
    - Status of integration of CTS, cargo, and crew (if applicable).
    - Planned launch windows and available back-up opportunities; planned mission profile and activities including any special operations.
    - CTS propellant and power budget (nominal and margins) and associated loiter capability.

  - Crew consumables budget (nominal and margins) for free flight phases (if applicable).
  - Summary of all open work and closure plan.
  - Summary of all risks or watch items including mitigation plans and/or acceptance rationales that may affect the ability of the crew member(s) or spacecraft to complete the mission.
  - Operations support readiness (facilities, tools, processes, products, personnel) for all phases of the mission.
- **Flight Readiness Review (FRR) –** At approximately two (2) weeks prior to launch (L-2 wk.), SpaceX shall host an FRR with NASA participation. In this review, SpaceX shall verify that all critical items required to proceed into the final launch countdown are ready. NASA will provide go/no-go concurrence at the FRR for SpaceX to conduct the flight test.
- **Undocking Readiness Review –** At approximately two (2) weeks prior to landing, SpaceX shall participate in an Undocking Readiness Integrated Management Team (IMT) and, at a minimum, provide:
  - Planned landing windows, available backup opportunities, weather report.
  - Cargo to be returned.
  - CTS resources margins.
- **Post Flight Reviews (PFRs) –** SpaceX shall conduct PFRs with NASA participation to assess mission success with supporting data in accordance with DRD 209 Post Flight Assessment (PFA) Report and the following:
  - The initial PFA shall be delivered no later than 14 days after docking with the ISS. The first PFR shall be held at approximately the same time.
  - The final PFA shall be delivered no later than 30 days after landing. The final PFR shall be held at approximately the same time.

2.3.3 Mission Integration

SpaceX shall ensure the safe integration and transport of crew and/or cargo to and from the ISS during the flight tests. SpaceX shall put in place and support integration and operations processes for the entire mission from prelaunch to postlanding. SpaceX shall integrate the crew and/or cargo complement and, at the vehicle level, perform analysis and integration to safely execute the flight to and from the ISS including cargo turnover and crew handover as applicable. The reviews and deliverables listed below will incrementally mature the mission design, cargo manifest and configuration, structural and environmental analyses, mission success criteria, operations and crew training, Federal and range safety documentation, ISS Safety Assessments and overall flight readiness.



Hazard Reports, DRD 110**.** SpaceX shall deliver CTS hazard reports in accordance with CCT-PLN-1120, Crew Transportation Technical Management Processes, and DRD 110 Hazard Reports to ensure that hazards inherent to the design have been identified and that controls and verification methods have been implemented. SpaceX shall present the hazard analysis to NASA ISS SRP and the CCP STRB in order to complete the phased safety review in accordance with SSP 30599. The phased safety review is complete after NASA approval of all hazard reports and completion of all verification events used to verify hazard controls.

Verification Closure Notices, DRD 111. SpaceX shall deliver verification closure notices in accordance with DRD 111, Verification Closure Notices (VCNs). SpaceX shall meet all applicable SSP 50808 and CCT-REQ-1130 requirements and deliver verification rationale and evidence to show compliance with all these space station, crew safety and vehicle requirements.

Range Safety Documentation, DRD 113. SpaceX shall comply with all applicable Range requirements and shall deliver copies of all Range Safety documentation to NASA, including nonconformance requests in accordance with DRD 113.

CTS Data Input for NASA Integration and Independent Verification and Validation, DRD 114, as applicable**.** SpaceX shall provide insight, data, and support to meet the requirements of DRD 114 and ensure NASA has sufficient engineering data to do independent technical analysis.

Vehicle Interface Definition Document (IDD), DRD 203. SpaceX shall provide a vehicle IDD and instrumentation plan in accordance with DRD 203. SpaceX shall measure and provide telemetry data confirming that the required launch, entry, and orbit conditions and cargo environments were met as stated in DRD 203 Vehicle IDD. The Baseline IDD shall be submitted as a formal deliverable 45 days prior to the Certification Baseline Review (CBR). SpaceX shall deliver updated IDDs as required, including the Final IDD for the Flight Test without Crew no later than L-12 months and the Final IDD for the Flight Test with Crew at L-18 months.

Mission Resource Allocation Document (MRAD), DRD 204. SpaceX shall complete required mission specific analysis to ensure mission safety and success and deliver for each flight the Mission Resource Allocation Document (MRAD) in accordance with DRD 204 Mission Resource Allocation Document (MRAD). SpaceX shall incorporate the NASA provided pressurized cargo complements, if there is cargo on the test flights, into the MRAD and use the complements to develop the preliminary and final cargo configurations. [redacted] Some configurations or changes may not be allowed to ensure the safety of the vehicle. Coupled loads analysis and integrated thermal analysis shall be run for the initial and delta MRADs. The MRAD confirms compliance with environments defined in the Vehicle IDD and applicable requirements outlined in SSP 50808 and CCT-REQ-1130. The initial MRAD shall be delivered at L-10 months, the delta MRAD shall be delivered at L-3 months, and the final MRAD shall be delivered at L-1 month.

CAD Models, DRD 205 and Mass Properties Reports. SpaceX shall submit spacecraft engineering computer-aided design models for each of the test flights in accordance with DRD 205 Spacecraft Computer Aided Design (CAD) Models. The Baseline CAD model shall be submitted as a formal deliverable 45 days prior to the Certification Baseline Review (CBR). SpaceX shall deliver updated CAD models as required and the Final CAD model no later than 13 months prior to each of the Flight Tests (with and without Crew). If laser scanned correlated CAD models are required, those shall be delivered after the Crew Dragon vehicle ships to the launch site. Additionally, SpaceX shall provide mass properties reports in accordance with the MRAD and IMS.

Imagery and Associated Cataloging, DRD 210. SpaceX shall submit CTS imagery in accordance with DRD 210 Imagery and Associated Cataloging. The imagery plan shall be submitted no later than L-6 months for each test flight.

2.3.4 CTS Integration

CTS integration shall be achieved in multiple stages, with rigorous testing at various phases.

Licenses - SpaceX shall provide technical expertise and participate in NASA/FAA/Range trilateral discussions representing their recommendations when crew safety and public safety risk considerations are assessed. SpaceX shall obtain all other required support services, permits, and licenses that are necessary to execute the mission. These may include Department of Transportation permits and Federal Communications Commission licenses.

Launch Site Processing Operations - SpaceX shall provide launch infrastructure at LC-39A that will be expanded to meet the needs of the CTS. The launch site infrastructure shall include dedicated ground support equipment, personnel, facilities and processing procedures to ensure safe missions to the ISS. The launch site facilities and operations shall support the following functions:

- Crew familiarization and training (only for the flight to ISS with crew).

- Crew flight processing (only for the flight to ISS with crew).
- Vehicle and cargo receiving inspection.
- Integration and storage areas, and all associated tooling.
- Post-shipping checkouts to verify the integrity of the avionics, propulsion, TCS, RF and ECLSS systems.
- Final mate of the capsule and trunk.
- Final closeout inspections.
- Crew interface operations (only for the flight to ISS with crew).
- ISS integration, as-built inspections.
- Crew equipment interface testing (CEIT) (only for the flight to ISS with crew).
- [redacted] load readiness review.
- Consumables load [redacted]
- Flight and launch readiness reviews.
- Final Crew Dragon mate to Falcon 9.
- Terminal countdown demonstration test (TCDT) (only for the flight to ISS with crew).
- Static fire.
- Crew and cargo turnover and load onto vehicle, if required.
- Launch.

Recovery Site Processing Operations - SpaceX shall provide primary and alternate landing support for both of the test flights. For the flight to ISS with crew, SpaceX shall provide the following services at the landing site:

- [redacted]
- Perform crew extraction.
- [redacted]
- Remove and inventory any time-critical cargo and turn over to NASA.

SpaceX shall provide an operational interface and coordinate with the Government in the planning for emergency crew search and rescue services.

Range Support Services - SpaceX follows all Range requirements and protocol, and provides documentation to NASA according to DRD 113. SpaceX shall work with the Range to meet CTS needs in the following areas:

- Range scheduling.
- Tracking and flight termination.
- Telemetry.
- Imagery.

- Weather.
- Explosives storage.
- SCAPE (self-contained atmospheric protective ensemble) suits.
- Helium and nitrogen pipeline commodities.

Launch and Landing - SpaceX shall perform advance launch, rendezvous and entry opportunity studies, considering all relevant factors, including ISS trajectory projections and scheduled reboost activities, ISS visiting vehicle schedules, ISS crew and cargo manifest constraints, and specific landing sites.

Flight Imagery - SpaceX shall submit CTS imagery in accordance with DRD 210 Imagery and Associated Cataloging. Prior to launch, a pre-flight imagery plan shall be used to capture orbital vehicle, cabin layout, crew interfaces, instrumentation and pressurized cargo. The imagery plan shall be delivered at L-6 months.

Telemetry - SpaceX shall measure and provide telemetry data confirming that the required launch, entry, and orbit conditions and cargo environments were met as stated in DRD 203 Vehicle Interface Definition Document (IDD). This shall include a detailed listing and description of all measurements and calibration coefficients.

2.3.5 Crew Integration

For the flight to ISS with crew, SpaceX shall use the mission integration process, including certification and mission milestone reviews to prepare for crew and cargo integration with the Dragon-Falcon 9 Crew System.

Crew Integration - SpaceX shall develop plans to safely and effectively train and prepare the crew for flight.

- **Crew Training** - SpaceX shall provide a comprehensive training program to prepare NASA crew members for each mission. SpaceX shall provide general training to all crew members, including mission and systems familiarization, nominal and off-nominal crew procedures, space suit operations, monitoring and crew-commanding of ascent aborts, and nominal and emergency Dragon post-landing and pad ingress/egress. SpaceX shall provide syllabi, training materials, simulations, crew cabin task training, and certification for the crew training program.
    - SpaceX shall define the necessary pre-launch testing such as Terminal Countdown Demonstration Test (TCDT) and Crew Equipment Interface Test (CEIT) that include flight controllers, crews, and required NASA and Contractor support personnel. Details of the crew integration process, training, CEIT, and TCDT shall be outlined in the MIOMP.

- SpaceX shall participate in Joint Multi-Segment Simulation Training (JMST) that includes flight controllers and crew participation.
- SpaceX shall provide the required high-fidelity CTS and ground facilities hardware, software, and data for interfacing with NASA, Software Development Integration Laboratory, and JSC Mission Control Center (MCC) to execute Joint spacecraft-ISS testing and Joint Multi-Segment Simulation Trainings (JMSTs).

- **Crew Flight Processing** - SpaceX shall assist in crew ingress on the launch pad and egress at the recovery site. SpaceX shall meet applicable landing, egress, and additional crew supplies requirements levied by CCT-REQ-1130.
- **Contractor Crew Operations of the CTS -** If there are contractor crew members on the Flight to ISS with Crew mission, SpaceX shall define and implement a process that complies with SSP 50260, ISS Medical Operations Requirements Document, and SSP 50667, Medical Evaluation Document, Volumes A-C.

2.3.6 Cargo Integration

If cargo is to be flown on either of the test flights, SpaceX shall perform the tasks outlined in this section.

SpaceX shall provide a spacecraft pressurized module physical configuration per DRD 204 MRAD and any constraints related to manifest and return flexibility. SpaceX shall identify constraints to the on-orbit packing of cargo for return per the final DRD 204 MRAD. NASA will maintain the capability to adjust the return cargo complement within the identified constraints while the spacecraft remains mated to the ISS. NASA will plan cargo transfers with SpaceX coordination and in accordance with identified constraints while the spacecraft remains docked to the ISS.

Prior to cargo integration, SpaceX shall develop an internal cargo interface control agreement in accordance with DRD 206 Internal Cargo Interface Control Agreement (ICA) for middeck lockers and for items planned to be hard-mounted in the spacecraft volume per DRD 204 MRAD. The Baseline ICA template shall be submitted as a formal deliverable 45 days prior to the Certification Baseline Review (CBR). Baseline cargo-specific ICAs will be delivered no later than L-12 months, and final ICAs will be submitted no later than L-8 months. SpaceX shall document the cargo ground handling procedures and constraints in the ICAs and/or integration procedures.

SpaceX shall conduct power/data testing for all first-time-flown powered middeck lockers to ensure interface compliance.

SpaceX shall submit DRD 207 Integrated Cargo Phase III Hazard Report per SSP 30599, Safety Review Process, at L-4 months, to ensure the hazards associated with the packaging of the cargo complement have sufficient controls. SpaceX shall submit a delta integrated cargo hazard report as required according to DRD 207 Integrated Cargo Phase III Hazard Report that represents the

final integrated cargo hazard assessment provided to NASA. SpaceX shall present the Cargo Phase III hazard analysis to NASA in order to complete the phased safety review in accordance with SSP 30599 with both the ISS SRP and the CCP STRB. The safety review is complete after NASA has approved all cargo hazard reports and completion of all verification items used to verify controls for cargo hazards.

SpaceX shall document discrepancies to hardware turned over to SpaceX and report those discrepancies to NASA within forty-eight (48) hours of identifying the discrepancy.

SpaceX shall affix their bar code labels per the ISS Inventory Management System (IMS) standard to Commercial cargo that will be transferred from the spacecraft to the ISS and shall correlate IMS bar code numbers to stowage location data for all cargo flown and provide this data to NASA in accordance with the final DRD 204 MRAD.

SpaceX shall safely integrate cargo into the spacecraft.

3 CERTIFICATION MATURITY

The Insight Implementation Plan (DRD 001), which was delivered with SpaceX's proposal, shall ensure effective and extensive technical interaction between SpaceX and NASA during CCtCap. An updated version of the Insight Implementation Plan shall be delivered at CBR.

At CBR, SpaceX also shall deliver documentation of previously approved variances and alternate standards incorporated or tailored in requirements, the DRD 108 Verification and Validation (V&V) Plan, and the DRD 107 Certification Plan.

SpaceX shall deliver DRD 110 Hazard Reports at the Design Certification Review. SpaceX also shall deliver any new, open or changed DRD 110 Hazard Reports at the Operations Readiness Review.

3.1 PWS Additions in Response to CPC Final Technical Summary Report

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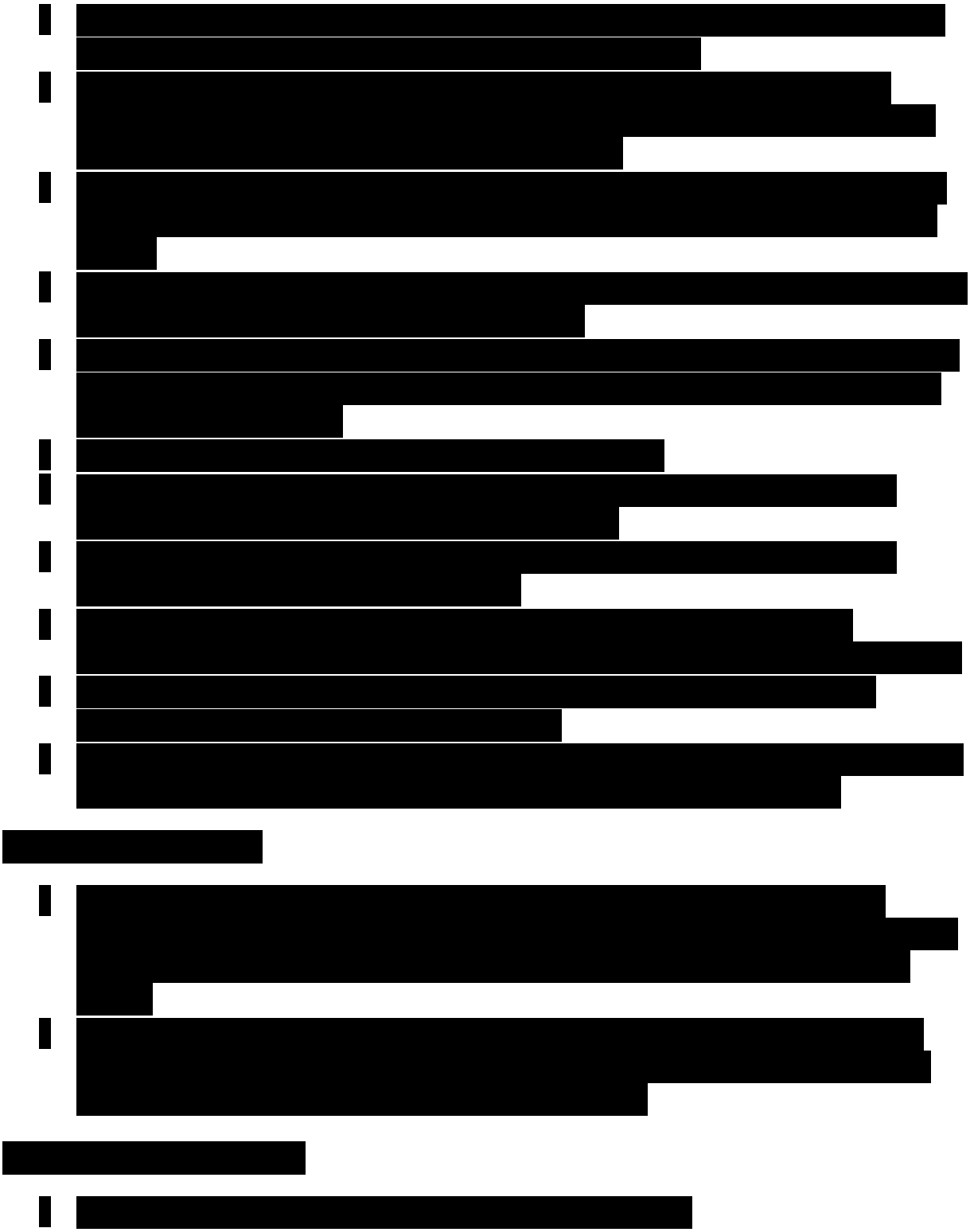
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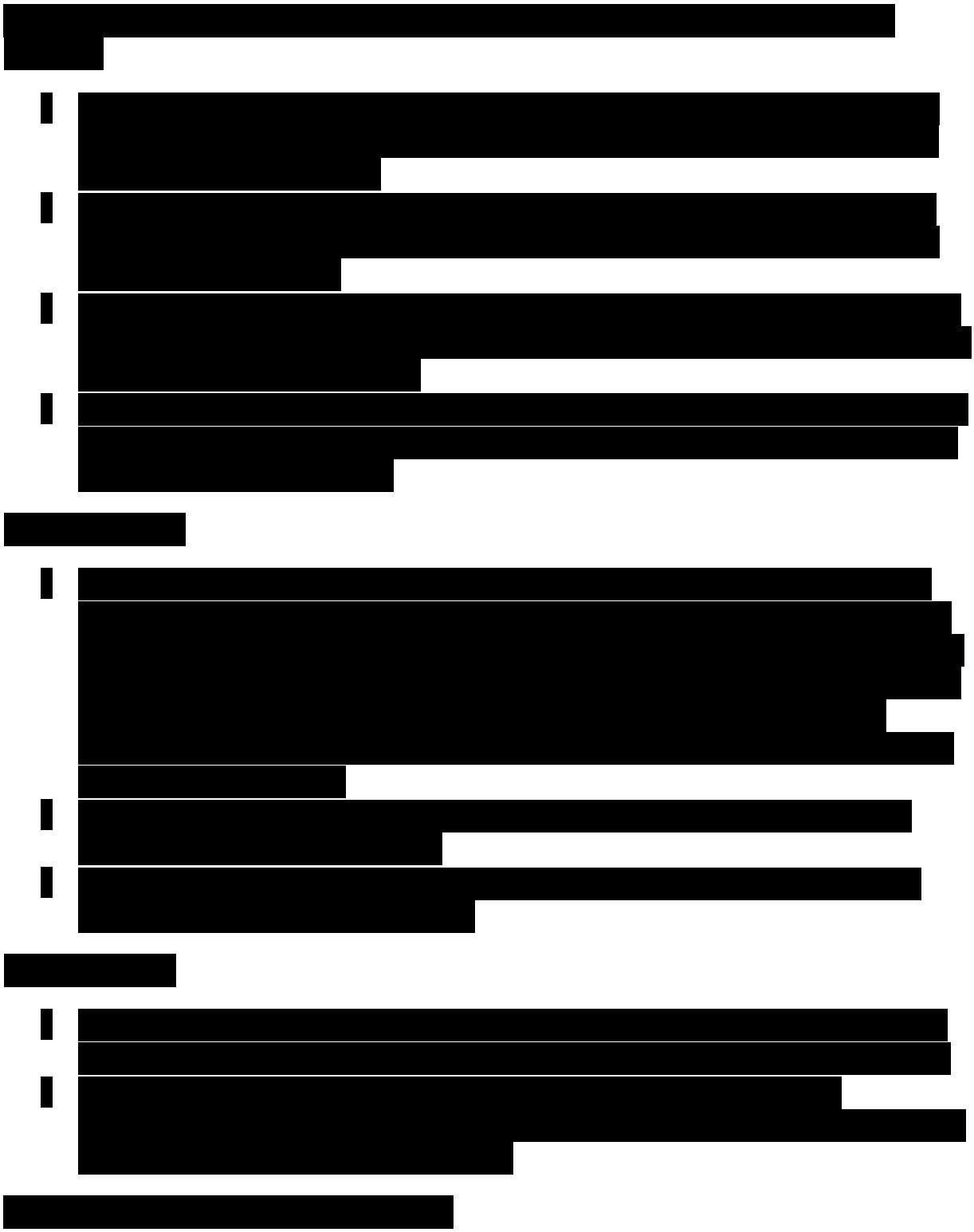
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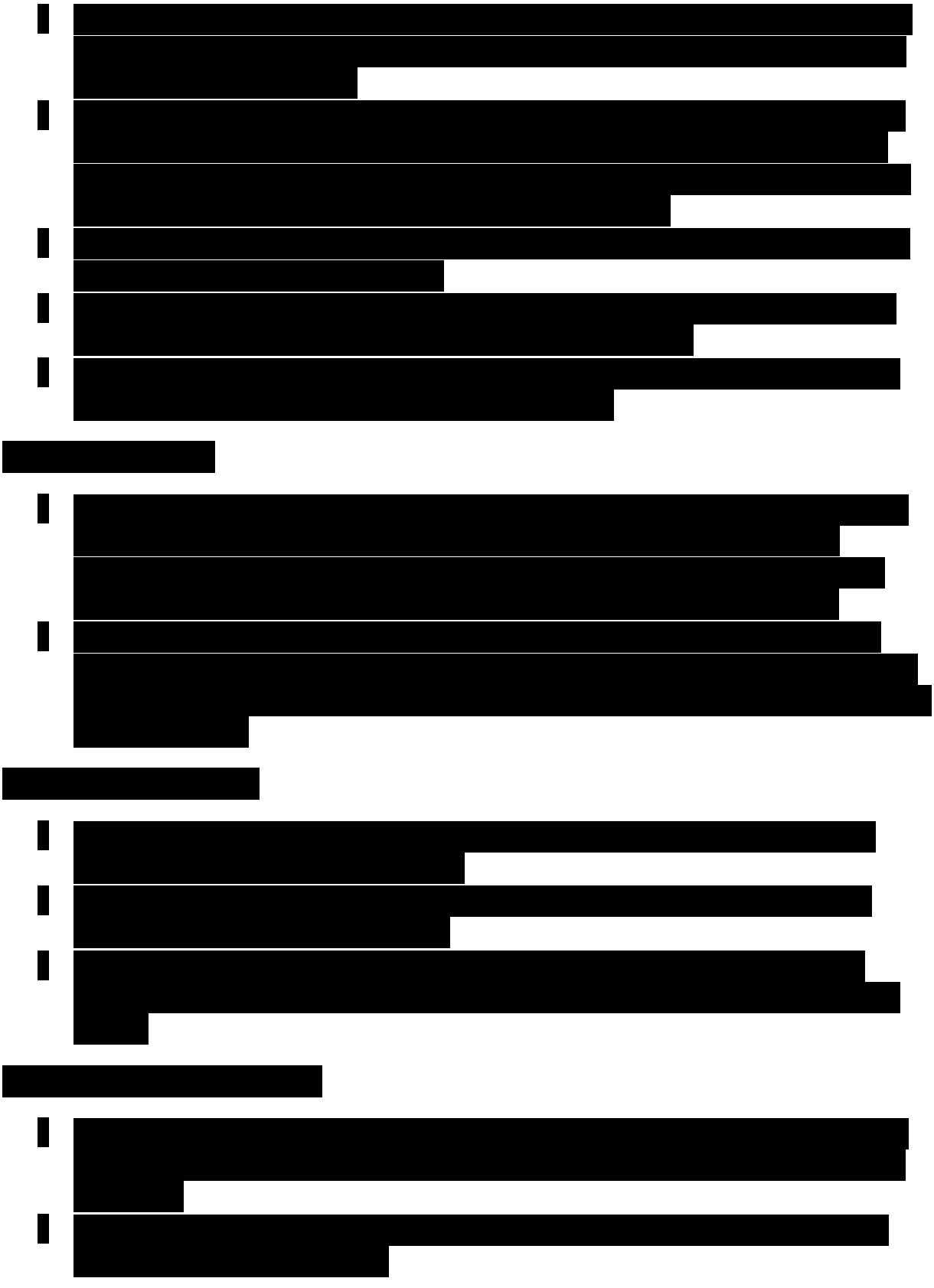
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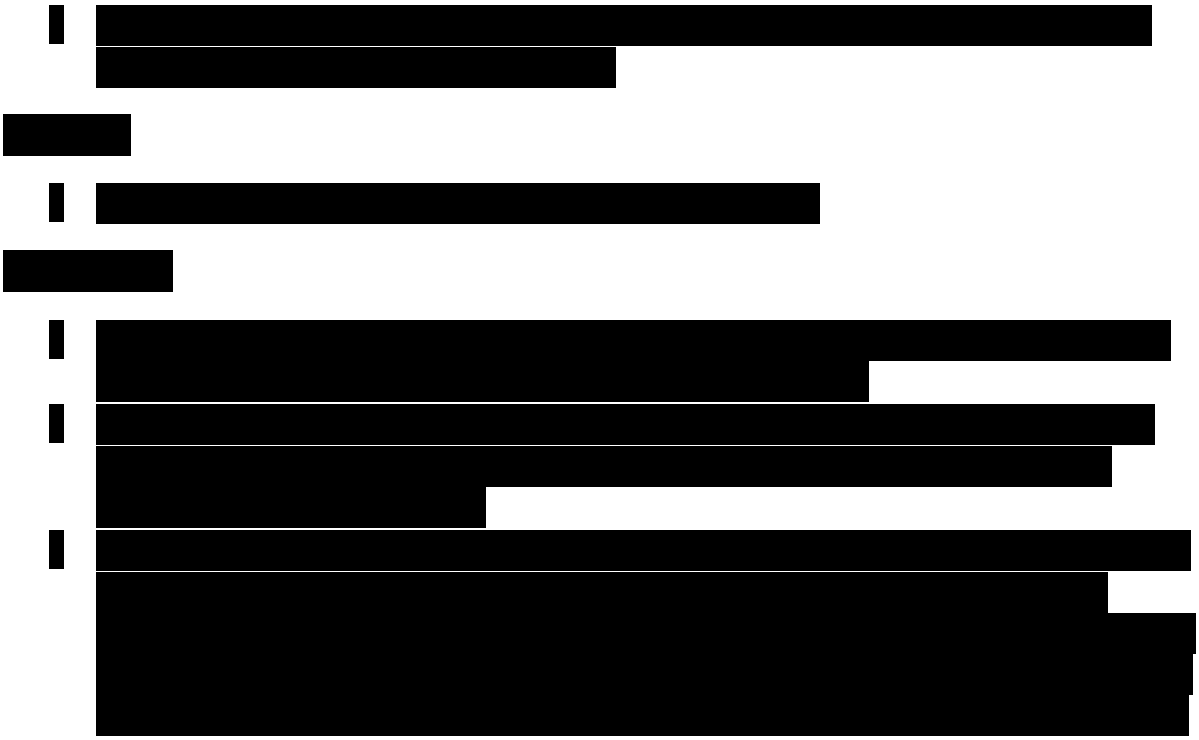
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4 POST-CERTIFICATION MISSIONS (CLIN 002)

SpaceX shall build, process, integrate and operate the CTS for the mission to the ISS. SpaceX shall conduct PCMs, including all activities from production, integration, and mission planning through safe recovery of the crew and postflight assessment, which shall include any unplanned events and in-flight anomalies. The approach for PCM planning and execution shall be repeatable with the lowest achievable safety risk. CCT-STD-1150, SSP 50808, and JSC 35089 define the preflight and mission planning and integration processes, standards and products that NASA uses for PCMs to ISS. SpaceX's processes defined in support of this objective shall satisfy CCT-PLN-1120 and define the expected mission integration rhythm, handover points, and roles of the SpaceX team.

SpaceX shall maintain NASA certification of the CTS for all PCMs. Design, production, or operational changes from the NASA certification baseline shall be reviewed for their effect on compliance to the requirements of CCT-REQ-1130 and SSP 50808. System performance from previous production, operation or flights also shall be reviewed for the potential effects on the NASA certification.

4.1 Mission Planning Management and Execution

SpaceX shall perform mission planning, management and execution activities. Mission planning management and execution includes the plans, processes, schedules, reviews and products required to perform the flight design, analyses and flight planning activities; flight products and procedure development; and execution of at least two (2) PCMs.

SpaceX shall deliver DRD 201 Mission Integration and Operations Management Plan (MIOMP) and DRD 202 Post Certification Mission (PCM) Work Plan. These documents outline the overall approach to managing and executing PCMs. SpaceX shall ensure that the interdependencies between the ongoing core certification effort and post-certification mission objectives are addressed in its development plan and mission execution planning.

4.1.1 Mission Milestones

SpaceX shall complete the mission milestones defined below. These milestones include reviews with NASA as well as performance-based milestones. SpaceX shall deliver and maintain the PCM Work Plan (DRD 202), which shall establish the planning, acceptance criteria, and execution of each milestone. SpaceX will ensure that there is adequate time for NASA-SpaceX interaction, adhere to our action item resolution process, and apply lessons learned from previously held mission reviews. All milestones and associated DRDs shall be planned and tracked in the Integrated Master Schedule (IMS). The PCM mission milestones are listed below along with their completion and acceptance criteria.

[redacted]



- **Vehicle Baseline Review (VBR)**

  At no later than 18 months prior to launch (L-18 mo.), SpaceX shall co-chair a Vehicle Baseline Review (VBR) with NASA that establishes the integrated mission CTS configuration (launch vehicle, orbital vehicle, and ground systems) that accommodates NASA requirements for crew and cargo transportation. The intent of the VBR is to establish the baseline CTS for the mission and identify any design or operation changes from the previous baseline and the corresponding plans for executing and verifying these changes. The content for the VBR shall include:

  - Mission Baseline CTS

SpaceX shall, at this review:

- Baseline the post-certification mission objectives, to include crew and cargo complement, and associated baseline CTS configuration, including ground accommodation specific interfaces and service agreements, so that mission integration efforts have definite configuration, environments and performance capabilities identified.
- Reconfirm the launch window as defined per Clause H.20, Adjustments to Post Certification Mission Schedule.
- Provide, if necessary, an updated DRD 201 Mission Integration and Operations Management Plan (MIOMP) and if necessary, an updated DRD 202 Post Certification Mission (PCM) Work Plan.
- Provide, as required, an update to DRD 203 Vehicle Interface Definition Document (IDD) and the mission-specific instrumentation plan for the Vehicle Interface Definition Document (IDD).
- Provide, as required, an update to DRD 205 Spacecraft CAD Models.

o Design and Operation Changes From Prior Mission Baseline CTS

SpaceX shall, at this review:

- Identify any design and operation changes from the previous mission baseline CTS.
- Identify all CCT-1100 series and SSP 50808, ISS to Commercial Orbital Transportation Services (COTS) Interface Requirements Document (IRD), requirements that require re-verification and have been allocated to the appropriate system, subsystem and/or component level. Demonstrate requirements flow down is adequate to verify compliance with CCT-1100 series and SSP 50808.
- Identify any hazards, controls, or verifications that are affected by design changes.
- Discuss analyses and tests to be performed to execute these designs and operation changes and include their methodology, assumptions and results, along with comparisons to any similar proven designs.
- Show how these changes affect performance, reliability and environments and associated risks.
- Discuss how previous in-flight anomaly (IFA) and previous production non-conformances affect the mission baseline.
- Present the status or results of any mission-unique or special study task assessments requested by NASA.

- Provide a schedule to complete all work required to accomplish the design changes and close requirement verifications prior to the Mission Certification Review (MCR).
- Provide updates to design margins (spacecraft and launch vehicle) if margins changed.
- Identify updates to the overall system architecture including ground accommodation specific interfaces and service agreements.
- Identify any mission-unique and unproven processes, risks and mitigation plans.
- Present the operations concept to satisfy mission objectives.
- Identify updates to operational products, personnel certification, facilities changes, and provide any scope and/or schedule changes for crew training.
- Status crew-related items to be proposed by SpaceX in the MIOMP.

VBR acceptance criteria:



- **Mission Integration Review (MIR)**

  At no later than (NLT) thirteen (13) months prior to launch (L-13 mo.), SpaceX shall co-chair a Mission Integration Review (MIR) with NASA with a current mission integration status. NASA and Contractor will review and baseline the conditions and inputs for

mission specific analytical assessments. SpaceX shall demonstrate CTS operations and production activities in support of the launch date. A status of all open items presented at VBR shall be presented at this review. For open items, schedule plans for completion shall be presented. All milestones to this point shall have been met. The content for the MIR shall include:

- Mission Baseline CTS

  SpaceX shall, at this review:

  - Reconfirm the launch window as defined in Table H.20.1, Launch Windows for PCM ATP Prior to ISS DCR, or defined in Table H.20.2, Launch Windows for PCM ATP after ISS DCR, per Clause H.20, Adjustments to Post Certification Mission Schedule.
  - Provide, as required, an update to DRD 203 Vehicle Interface Definition Document (IDD) and an update to the mission specific instrumentation plan for the Vehicle Interface Definition Document (IDD).
  - Provide initial data and parameters for Mission Success Determination per Clause H.21, Post Certification Mission Success Determination.
  - Provide, if necessary, an updated DRD 201 Mission Integration and Operations Management Plan (MIOMP) and if necessary, an updated DRD 202 Post Certification Mission (PCM) Work Plan.

- Design Changes From Prior Mission Baseline CTS

  SpaceX shall, at this review:

  - Present designs and their supporting analyses that implement mission-unique requirements.
  - Present progress in manufacturing and lay out remaining milestones and risks to accomplishing them.
  - Present progress towards closure of CCT-1100 series and SSP 50808 requirements, and lay out remaining milestones and risks to accomplishing them.
  - Present progress of ISS integration and integrated safety hazard assessments. Integrated safety analysis identifying any remaining hazards and proposed resolution per CCT-PLN-1120 Section 4.5, Integrated Safety Review Process.
  - Present progress for changes identified at VBR for:
    - The overall system architecture including ground accommodation specific interfaces and service agreements.
    - Mission-unique and unproven processes, risks and mitigation plans.

- Operational products, including personnel certification, facilities and crew training.

- Discuss how technical problems and anomalies have been resolved and effects of design changes on system performance, reliability and safety.
- Discuss how simulations and prototyping results for CTS do not present any potential mission risks.
- Present defined test plans for CTS.
- Status crew related items to be proposed by SpaceX in the MIOMP.

MIR acceptance criteria:



- **Mission Certification Review (MCR)**
  After NASA certification has been granted, and no later than four (4) months prior to launch (L-4 mo.), SpaceX shall co-chair with NASA a Mission Certification Review (MCR) that allows NASA to assess if SpaceX has completed certification of all requirements, has completed ISS integration, has all infrastructure, facilities, personnel and services in place, and will be ready for the mission and for crewed operations, including agreement on cargo turnover and crew handover. A status of all open items presented in both the VBR and MIR shall be presented at this review. All mission-unique design qualification and acceptance testing shall be complete. For open items, schedule plans for completion shall be presented. All milestones to this point shall have been met.

SpaceX shall, at this review:

- Reconfirm the launch window as defined in Table H.20.1, Launch Windows for PCM ATP Prior to ISS DCR, or defined in Table H.20.2, Launch Windows for PCM ATP after ISS DCR, per Clause H.20, Adjustments to Post Certification Mission Schedule.
- Provide the final specific mission instrumentation plan and an update, as required, to DRD 203 Vehicle Interface Definition Document (IDD).
- Present evidence of verification closures for mission-unique designs and requirements.
- Present evidence of verification closures for all open CCT-1100 series and SSP 50808 requirements.
- Provide all analytical assessments that show the compatibility of crew and cargo mass, when applicable, with the launch and spacecraft such as integrated loads, Launch to Activation thermal assessments, electromagnetic interference (EMI), propellant resources and power.
- Present status of all anomalies and associated corrective actions showing low-risk closure plans in place to completion prior to ISS Stage Operational Readiness Reviews (SORR) / Flight Readiness Review (FRR).
- Present evidence that all Safety Assessments have been approved by NASA.
- Present evidence that all open items in both the VBR and MIR have been closed or present plans showing low risk to completion prior to SORR / FRR.
- Provide final data and parameters for mission success determination.
- Reach agreement on NASA-identified Launch Commit Criteria (LCC) constraints concerning CTS, ISS, crew and cargo.
- Present evidence that all operational products, plans, processes and training are complete or present plans showing low risk to completion prior to SORR/ FRR.
- Define the post-flight data for review.
- Present status of crew-related items to be proposed by SpaceX in the MIOMP.
- Present status of acceptance testing (launch vehicle and spacecraft).

MCR acceptance criteria:



- Analytical assessments show compatibility of crew and cargo with the Crew Dragon resources (mass, thermal, loads, EMI, propellant, power).
- Anomalies and associated corrective actions have low-risk closure plans in place before FRR.
- All safety assessments have been approved by NASA.
- All open items for VBR and MIR have been closed or have plans in place showing low risk of non-completion prior to FRR.
- Final data and parameters for mission success determination have been provided.
- Agreement on NASA-identified launch commit criteria (LCC) constraints has been reached.
- Operational products, plans, processes and training have been completed or there are plans showing low risk of non-completion before FRR.

[redacted]

- **ISS Stage Operational Readiness Review (SORR)**
  At approximately three (3) weeks prior to launch (L-3 wk.), SpaceX shall participate in the ISS Stage Operational Readiness Reviews (SORR) and provide, at a minimum, the following via data and presentation:
  - Status of integration of CTS, cargo, and crew.
  - Planned launch windows and available back-up opportunities; planned mission profile and activities including any special operations.
  - CTS propellant and power budget (nominal and margins) and associated loiter capability.
  - Crew consumables budget (nominal and margins) for free flight phases.
  - Summary of all open work and closure plan.
  - Summary of all risks or watch items including mitigation plans and/or acceptance rationales that may affect the crewmember(s) or commercial spacecraft's ability to complete their mission.
  - Operations support readiness (facilities, tools, processes, products, personnel) for all phases of the mission.

- **Flight Readiness Review (FRR)**

  At approximately two (2) weeks prior to launch (L-2 wk.), SpaceX shall support the NASA Flight Readiness Reviews (FRRs). SpaceX shall provide a mission-specific DRD 208, Flight Readiness Review Data Package in support of the FRR. This support will confirm the following:
  - All critical items required to proceed into final launch countdown are ready.
  - All CTS systems have been verified for launch.

- All previously held Contractor readiness review actions have been closed or resolved.
- Launch Site, Range, FAA, and recovery support organizations have committed to launch.
- Tracking and data support resources have committed to launch.
- Any open work or constraints to launch are identified, and closeout plans and schedules are in place and supportable.
- Residual mission risks are known, documented, and presented for acceptance.
- Operational elements are ready to support all phases of the mission.

FRR acceptance criteria:

[redacted]

- **Undocking Readiness Review**
  At approximately two (2) weeks prior to landing, SpaceX shall participate in an Undocking Readiness Integrated Management Team (IMT) and, at a minimum, provide:
  - Planned landing windows, available backup opportunities, and weather report.
  - Cargo to be returned.
  - CTS resources margins.

- **Post Flight Reviews (PFR)**
  SpaceX shall conduct post flight reviews (PFRs) with NASA participation to assess mission success with supporting data in accordance with DRD 209 Post Flight Assessment (PFA) Report.
    - The initial PFA shall be delivered no later than 14 days after docking with the ISS. The first PFR shall be held at approximately the same time. The Launch and Docking payment milestone is tied to this initial PFR and the meeting of Mission Success Criteria from pre-launch through crew ingress to the ISS.
    - The updated PFA shall be delivered no later than 14 days after landing. The final PFR shall be held at approximately the same time. The Post Flight Review payment milestone is tied to this final PFR and meeting Mission Success Criteria from crew ingress on ISS through end of mission.
    - The final PFA report shall be delivered to NASA no later than 60 days after landing.

  PFR acceptance criteria:



4.1.2 Mission Schedule

SpaceX shall complete all required mission and interim performance milestones, as well as the associated DRDs to demonstrate progress and readiness for operational crewed missions to the ISS. SpaceX shall develop and deliver an Integrated Master Plan/Integrated Master Schedule in accordance with DRD 002 Integrated Master Plan & Integrated Master Schedule. All PCM activities, reviews and products shall be scheduled and tracked in the Integrated Master Schedule (IMS) throughout the entire mission cycle. The DRD 202 PCM Work Plan shall list all scheduled milestones, payment milestones and completion criteria for each milestone. The PCM Work Plan, updated IMP and IMS shall be delivered for the first time prior to PCM ATP. The IMS shall be maintained and updated by SpaceX and delivered to NASA on a monthly basis.

SpaceX shall be able to execute PCM mission integration milestones concurrently with DDTE and certification. Additionally, SpaceX shall be able to manage, build and integrate up to the maximum allowable six PCMs at a flight rate of no more than two missions per year.

4.1.3 Mission Integration

SpaceX shall ensure the safe integration and transport of crew and cargo to and from the ISS. SpaceX shall put in place and support integration and operations process for all post-certification missions. SpaceX shall integrate the crew and cargo complement and, at the vehicle level, perform analysis and integration to safely execute the flight to and from the ISS including cargo turnover and crew handover. The mission integration and analysis process shall be structured by a series of reviews and deliverables implemented by NASA, SpaceX and cargo hardware providers. These reviews and deliverables will incrementally mature the mission design, cargo manifest and configuration, structural and environmental analyses, mission success criteria, launch window definition, operations and ISS crew training, Federal and range safety documentation, ISS Safety Assessments and overall flight readiness. The process shall begin at ATP, and end with the final postflight assessment report being submitted 60 days after landing.



Mission Integration Reviews. SpaceX shall host a number of major program reviews throughout the [redacted] leading up to each PCM in order to review and discuss in detail the vehicle baseline design, mission integration status, certification status and ultimately flight readiness.

Mission DRDs and Analysis. SpaceX shall deliver all associated PCM DRDs and documentation to support mission integration and demonstrate progress as listed below:

Hazard Reports, DRD 110. SpaceX shall deliver CTS hazard reports in accordance with CCT-PLN-1120, Crew Transportation Technical Management Processes, and DRD 110 Hazard Reports to ensure that hazards inherent to the design have been identified and that controls and verification methods have been implemented.

Verification Closure Notices, DRD 111. SpaceX shall deliver verification closure notices in accordance with DRD 111, Verification Closure Notices (VCNs). SpaceX shall meet all SSP 50808 and CCP-REQ-1130 requirements and deliver verification rationale and evidence to show compliance with all these space station, crew safety and vehicle requirements.

Certification Data Package, DRD 112. SpaceX shall deliver a certification data package in accordance with CCT-PLN-1120 and DRD 112 that provides supporting evidence to show that the system meets all operational and design technical requirements.

Range Safety Documentation, DRD 113. SpaceX shall comply with all applicable Range requirements and shall deliver DRD 113 Range Safety Documentation to NASA, including nonconformance requests in accordance with DRD 113.

CTS Data Input for NASA Integration and Independent Verification and Validation, DRD 114. SpaceX shall provide insight, data and support to meet the requirements of DRD 114 and ensure NASA has sufficient engineering data to do independent technical analysis.

Mission Integration and Operations Management Plan (MIOMP), DRD 201. SpaceX shall deliver the MIOMP in accordance with DRD 201 MIOMP.

PCM Work Plan, DRD 202. SpaceX shall deliver the PCM Work Plan to establish mission milestones in accordance with DRD 202. Additionally, SpaceX shall use the PCM Work Plan to define launch windows.

Vehicle Interface Definition Document (IDD), DRD 203. SpaceX shall provide a vehicle IDD and instrumentation plan in accordance with DRD 203. SpaceX shall measure and provide telemetry data confirming that the required launch, entry, and orbit conditions and cargo environments were met as stated in DRD 203 Vehicle IDD. The IDD instrumentation plan shall include a detailed listing and description of all measurements and calibration coefficients. Additionally, SpaceX shall document the model requirements for cargo thermal and structural models in the Vehicle Interface Definition Document (IDD).

Mission Resource Allocation Document (MRAD), DRD 204. SpaceX shall complete required mission-specific analysis to ensure mission safety and success and deliver for each flight the Mission Resource Allocation Document (MRAD) in accordance with DRD 204 Mission Resource Allocation Document (MRAD). SpaceX shall incorporate the NASA-provided pressurized cargo complements into the MRAD and use the complements to develop the preliminary and final cargo configurations. [redacted] Some configurations or changes may not be allowed to ensure the safety of the vehicle. Coupled loads analysis and integrated thermal analysis shall be run for the initial and delta MRADs. The MRAD confirms compliance with environments defined in the Vehicle IDD and requirements outlined in SSP 50808 and CCT-REQ-1130. NASA and SpaceX shall utilize the data from the MRAD in the mission analysis, mission procedures/training and crew/cargo integration.

CAD Models, DRD 205 and Mass Properties Reports. SpaceX shall submit spacecraft engineering computer-aided design models in accordance with DRD 205 Spacecraft Computer

Aided Design (CAD) Models. Additionally, SpaceX shall provide mass properties reports in accordance with the MRAD and IMS.

Interface Control Agreements (ICAs), DRD 206. SpaceX shall develop interface control documents (ICDs) and stowage interface agreements (SIAs) in accordance with DRD 206 Internal Cargo Interface Control Agreement (ICA).

Integrated Cargo Hazard Report, DRD 207. SpaceX shall submit DRD 207 Integrated Cargo Phase III Hazard Report per SSP 30599, Safety Review Process, at L-4 months, to ensure that the hazards associated with the packaging of the cargo complement have sufficient controls. SpaceX shall submit a delta integrated cargo hazard report as required according to DRD 207 Integrated Cargo Phase III Hazard Report that represents the final integrated cargo hazard assessment provided to NASA. SpaceX shall integrate with NASA's existing ISS Safety Review Panel (SRP) process.

Flight Readiness Review Package, DRD 208. SpaceX shall provide the FRR data package in accordance with DRD 208.

Post Flight Assessment Report, DRD 209. SpaceX shall provide initial, updated and final postflight assessments (PFAs) in accordance with DRD 209. In conjunction with the assessment reports, SpaceX shall host two postflight reviews approximately 14 days after docking with ISS and approximately 14 days after landing.

Imagery and Associated Cataloging, DRD 210. SpaceX shall submit CTS imagery in accordance with DRD 210 Imagery and Associated Cataloging.

4.1.4 CTS Integration

CTS integration shall be achieved in multiple stages, with rigorous testing at various phases.

Licenses - SpaceX shall secure a Federal Aviation Administration (FAA) license for all post-certification missions in accordance with Clause H.18, Licenses, Permits, and Other Authorizations for a Launch or Reentry Service Operator. SpaceX shall provide technical expertise and participate in NASA/FAA/Range trilateral discussions representing their recommendations when crew safety and public safety risk considerations are assessed. SpaceX shall obtain all other required support services, permits, and licenses that are necessary to execute the mission. These may include Department of Transportation permits and Federal Communications Commission licenses.

Launch Site Processing Operations - SpaceX shall provide launch infrastructure at LC-39A that will be expanded to meet the needs of the CTS. The launch site infrastructure shall include dedicated ground support equipment, personnel, facilities and processing procedures to ensure a safe crewed mission to the ISS. The launch site facilities and operations shall support the following functions:

- Crew familiarization and training.
- Crew flight processing.
- Vehicle and cargo receiving inspection.
- Integration and storage areas, and all associated tooling.
- Post-shipping checkouts to verify the integrity of the avionics, propulsion, TCS, RF and ECLSS systems.
- Final mate of the capsule and trunk.
- Final closeout inspections.
- Crew interface operations.
- ISS integration, as-built inspections, and crew equipment interface testing (CEIT).
- [redacted] load readiness review.
- Consumables load [redacted]
- Flight and launch readiness reviews.
- Final Crew Dragon mate to Falcon 9.
- Terminal countdown demonstration test (TCDT).
- Static fire.
- Crew and cargo turnover and load onto vehicle.
- Launch.

Recovery Site Processing Operations - SpaceX shall provide primary and alternate landing site support including:

- [redacted]
- Perform crew extraction.
- [redacted]
- Remove and inventory time-critical cargo and turn over to NASA.

SpaceX shall provide an operational interface and coordinate with the Government in the planning for emergency crew search and rescue services.

Range Support Services - SpaceX follows all Range requirements and protocol, and provides documentation to NASA according to DRD 113. SpaceX shall work with the Range to meet CTS needs in the following areas:

- Range scheduling.
- Tracking and flight termination.
- Telemetry.
- Imagery.
- Weather.

- Explosives storage.
- SCAPE (self-contained atmospheric protective ensemble) suits.
- Helium and nitrogen pipeline commodities.

Launch and Landing - SpaceX shall perform advance launch, rendezvous and entry opportunity studies, considering all relevant factors, including ISS trajectory projections and scheduled reboost activities, ISS visiting vehicle schedules, ISS crew and cargo manifest constraints, and specific landing site constraints. SpaceX shall present results of the launch, rendezvous and entry opportunity analysis at MCR and FRR.

Flight Imagery - SpaceX shall submit CTS imagery in accordance with DRD 210 Imagery and Associated Cataloging. Prior to launch, a preflight imagery plan shall be used to capture orbital vehicle, cabin layout, crew interfaces, instrumentation and pressurized cargo. The imagery plan shall be delivered at L-6 months and updated, if necessary, at L- 2 months.

Telemetry - SpaceX shall measure and provide telemetry data confirming that the required launch, entry and orbit conditions and cargo environments were met as stated in DRD 203 Vehicle Interface Definition Document (IDD). This shall include a detailed listing and description of all measurements and calibration coefficients.

4.1.5 Crew and Cargo Integration

SpaceX shall use the mission integration process, including certification and mission milestone reviews to prepare for crew and cargo integration with the Dragon-Falcon 9 Crew System.

Crew and Cargo Facilities - SpaceX shall provide procedures, timelines and constraints associated with crew and cargo, including roles and responsibilities and interfaces associated with NASA personnel, equipment and facilities in the MIOMP. The launch sites and landing sites shall provide resources for both crew and cargo needs.

Crew Integration - SpaceX shall develop plans to safely and effectively train and prepare the crew for flight.

- **Crew Training** - SpaceX shall provide a comprehensive training program to prepare NASA crewmembers for each mission. SpaceX shall provide general training to all crew members, including mission and systems familiarization, nominal and off-nominal crew procedures, space suit operations, monitoring and crew-commanding of ascent aborts, and nominal and emergency Dragon postlanding and pad ingress/egress. SpaceX shall provide syllabi, training materials, simulations, crew cabin task training and certification for the crew training program.
    - SpaceX shall define the necessary prelaunch testing such as terminal countdown demonstration test (TCDT) and crew equipment interface test (CEIT) that include flight controllers, crews, and required NASA and Contractor support

personnel. Details of the crew integration process, training, CEIT, and TCDT shall be outlined in the MIOMP.

- SpaceX shall participate in Joint Multi-Segment Simulation Training (JMST) that includes flight controllers and crew participation.
- SpaceX shall provide the required high-fidelity CTS and ground facilities hardware, software, and data for interfacing with NASA, Software Development Integration Laboratory, and JSC Mission Control Center (MCC) to execute joint spacecraft-ISS testing and Joint Multi-Segment Simulation Trainings (JMSTs).

- **Crew Flight Processing** - SpaceX shall assist in crew ingress on the launch pad and egress at the recovery site. SpaceX shall meet the landing, egress and additional crew supplies requirements levied by CCT-REQ-1130.

[redacted]

Cargo Integration - SpaceX shall provide a spacecraft pressurized module physical configuration per DRD 204 MRAD and any constraints related to manifest and return flexibility. SpaceX shall identify constraints to the on-orbit packing of cargo for return per the final DRD 204 MRAD. NASA will maintain the capability to adjust the return cargo complement within the identified constraints while the spacecraft remains mated to the ISS. NASA will plan cargo transfers with SpaceX coordination and in accordance with identified constraints while the spacecraft remains docked to the ISS.

Prior to cargo integration, SpaceX shall develop an internal cargo interface control agreement in accordance with DRD 206 Internal Cargo Interface Control Agreement (ICA) for middeck lockers and for items planned to be hard-mounted in the spacecraft volume per DRD 204 MRAD. SpaceX shall document the cargo ground handling procedures and constraints in the ICAs and/or integration procedures.

SpaceX shall conduct power/data testing for all first-time-flown powered middeck lockers to ensure interface compliance.

SpaceX shall submit DRD 207 Integrated Cargo Phase III Hazard Report per SSP 30599, Safety Review Process, at L-4 months, to ensure that the hazards associated with the packaging of the cargo complement have sufficient controls. SpaceX shall submit a delta integrated cargo hazard report as required according to DRD 207 Integrated Cargo Phase III Hazard Report that represents the final integrated cargo hazard assessment provided to NASA.

SpaceX shall document discrepancies to hardware turned over to SpaceX and report those discrepancies to NASA within forty-eight (48) hours of identifying the discrepancy.

SpaceX shall affix their bar code labels per the ISS Inventory Management System (IMS) standard to Commercial cargo that will be transferred from the spacecraft to the ISS and shall correlate IMS bar code numbers to stowage location data for all cargo flown and provide this data to NASA in accordance with the final DRD 204 MRAD.

SpaceX shall safely integrate cargo into the spacecraft.

4.1.6 CTS Certification Maintenance

SpaceX shall maintain NASA certification of the CTS for all PCMs. Design, production or operational changes from the NASA certification baseline are reviewed for their effect on compliance to the requirements of CCT-REQ-1130 and SSP 50808. System performance from previous production, operation or flights is also reviewed for the potential effects on the NASA certification. In addition, SpaceX shall ensure the interdependencies between the ongoing core certification effort, and PCM objectives are addressed in our development plan and mission execution planning.

Certification maintenance of the CTS shall be a collaboration between SpaceX and NASA to verify that each Dragon-Falcon 9 vehicle in the fleet is ready for flight as built, with all requirements verified. The certification maintenance effort consists of [redacted]

SpaceX shall deliver a Certification Data Package in accordance with DRD 112 Certification Data Package.

4.1.7 [redacted]

4.2

[redacted]

[redacted]

5 IDIQ SPECIAL STUDIES (CLIN 003)

In accordance with the task ordering procedures in this contract, SpaceX shall perform special studies in support of this contract as initiated by written direction from the Contracting Officer.

Attachment J-03, Appendix A, Milestone Acceptance Criteria and Payment Schedule

Certification Baseline Review (CBR) Interim Milestone

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): November 2014

Data/Data Requirement Deliverables (DRDs) to be provided: DRD 001, DRD 002, DRD 101, DRD 102, DRD 107, DRD 108, DRD 109, DRD 201, DRD 203, DRD 205, DRD 206, Key Performance Design Parameters Matrix, SSP 50833 COTS Cargo Interface Requirements Document, SSP 50977 ISS to COTS ICD for SpaceX Commercial Crew Transpiration System, Joint Integrated Verification Test Plan (JiVTP), BDEALS, BSHEALS, Concept of Operations Document, Crew Dragon Design Document, Falcon 9 Design Document, Dragon Software Requirements Baseline Document, Falcon Software Requirements Baseline Document, Software Design and Capabilities Baseline, Crew Dragon Schematics, Falcon 9 Schematics, Crew Dragon Bill of Materials, Falcon 9 Bill of Materials, Crew Dragon Thermal Analysis, Falcon 9 CAD Models, Crew Dragon CAD Models, System Safety Process, Human Error Analysis, Integrated Probabilistic Safety Analysis, Hazard Report Status, Fault Tolerance Assessment, Crew Survival Strategy, Margin Management Report, Crew Training Template, Crew Master Task List, Crew Task Analysis, Crew Workload and Usability Evaluations, Crew-In-The-Loop Test Plan, Risk Management Status, Final Management Plans and Products

Delivery of Data/DRDs (mo/yr): NLT 45 days before milestone reference **DRD 101 Milestone Review Plan**

Objective: At a NASA and Contractor co-chaired Certification Baseline Review (CBR) completed within ninety (90) days of contract start, the Contractor shall:

(a) Identify the Baseline requirements, including the allocation to the Elements and Subsystems of the CTS, incorporating the results of NASA's guidance provided under Certification Products Contract (CPC) (if applicable), which meet NASA's requirements defined in CCT-REQ-1130, *ISS Crew Transportation and Services Requirements Document* and SSP 50808, *International Space Station (ISS) to Commercial Orbital Transportation Services (COTS) Interface Requirements Document*.

(b) Identify the current Crew Transportation System (CTS) design baseline.

(c) Document management plans and products incorporating the results of NASA's disposition provided under Certification Products Contract (CPC) (if applicable), to meet requirements in the CCT-PLN-1120, *Crew Transportation Technical Management Processes*.

(d) Define the plan and schedule to complete Design, Development, Test, and Evaluation (DDTE) and certification for the CTS design, production, and operations.

(e) Define top safety, technical, cost and schedule risks based on most current CTS design.

Indicators of Milestone Readiness:
The Contractor has completed the following and provided to NASA:

(a) The requirements, including the allocation to the Elements and Subsystems of the CTS, incorporating the results of NASA's disposition under CPC (if applicable) which meet NASA's requirements defined in CCT-REQ-1130 and SSP 50808 including but not limited to:

(1) Documentation of previously approved variances and alternate standards incorporated or tailored in requirements
(2) Provide joint ISS integration products (Interface Control Documents (ICDs), Joint Integrated Verification Test Plan (JiVTP), Bi-lateral Data Exchange Agreement List and Schedule (BDEALS), Bi-lateral Hardware Software Exchange Agreement List and Schedule (BHSEALS)) identified in SSP 50964, *Visiting Vehicle ISS Integration Plan*.

(b) Documentation of the current CTS design baseline as defined in **DRD 102 Certification Baseline Review (CBR) Data Package**.

(c) The management plans and products as defined in **DRD 102 Certification Baseline Review (CBR) Data Package**.

(d) The **DRD 108 Verification and Validation (V&V) Plan**.

(e) The **DRD 107 Certification Plan**.

(f) The **DRD 002 Integrated Master Plan and Integrated Master Schedule** for CTS Certification activities.

(g) An assessment of the top safety, technical, cost, and schedule risks to CTS Certification, and documentation of the approach to manage and accept risk with CTS Certification.

(h) **DRD 001 Insight Implementation Plan** and documentation of the organizational interaction and personnel interfaces to achieve the objectives of the Insight Implementation Plan and Insight Clause.

(i) **DRD 101 Milestone Review Plan**.

(j) **DRD 109 Flight Test Plan**.

Acceptance Criteria:
(a) Requirements are baselined and controlled. The allocation of requirements to the CTS design baseline is complete.

(1) Requirements are traceable to CCT-REQ-1130 and SSP 50808.

(2) Variances and alternate standards have been incorporated and appropriately tailored into the Contractor's requirements.

(3) Technical coordination is complete for joint ISS integration products (ICDs, JiVTP, BDEALS, BHSEALS) identified in SSP 50964, and products are ready for ISS to baseline post CBR review.

(4) The Concept of Operations has been baselined.

(b) The CTS design definition products identified in the **DRD 102 Certification Baseline Review (CBR) Data Package** identify the current design baseline.

(c) Integrated vehicle performance and design margin is appropriate and supports completion of development.

(d) Management plans and products identified in the **DRD 102 Certification Baseline Review (CBR) Data Package** are in place, controlled and are being implemented. The plans and products identified in the CBR Data Package as type 2 have been approved.

(e) The **DRD 108 V&V Plan** has been Baselined.

(f) The **DRD 107 Certification Plan** has been Baselined.

(g) An **DRD 002 Integrated Master Plan and Integrated Master Schedule (IMP/IMS)** has been approved.

(h) The top safety, technical, cost and schedule risks are identified, assessed, and clearly communicated. Plans, processes, and appropriate resources necessary to effectively manage the risks are in place.

(i) **DRD 001 Insight Implementation Plan** has been approved. The organizational interaction and personnel interfaces to achieve the objectives of the Insight Implementation Plan and Insight Clause have been documented.

(j) **DRD 101 Milestone Review Plan** in accordance with the Data Requirement List (DRL) and DRD has been approved.

(k) **DRD 109 Flight Test Plan** in accordance with the DRL and DRD has been approved.

(l) A plan and schedule have been defined for the resolution of all actions and open items resulting from the CBR. All To be Determined (TBD) and To be Resolved (TBR) items are clearly identified with acceptable plans and schedules for their disposition.

Design Certification Review (DCR) Interim Payment Milestone
Initial Propulsion Module Testing Complete

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): April 2015

Data/Data Requirement Deliverables (DRDs) to be provided: Propulsion Module Test Plan, quick-look test report

Delivery of Data/DRDs (mo/yr): NLT 30 days before milestone (except as noted below)

Objective: [redacted]

way as to isolate the anomaly and allow for continued operation, or safing/shutdown of the [redacted]

Indicators of Milestone Readiness:

(a) Propulsion module test plan delivered to NASA at least 30 days before the start of the test campaign. The test plan will contain, at a minimum:

(1) Primary and secondary (if any) test objectives.

(2) Key differences between the test article and flight propulsion system.

(3) Test conditions and environment.

(4) Test matrix.

(5) Instrumentation list.

(b) All applicable components acceptance-tested.

(c) Assembly of the propulsion module test article completed.

(d) Non-reactive testing of the propulsion module completed, including:

(1) Propulsion system leak checks and functional tests.

(2) Avionics checkouts.

(e) Propulsion module test readiness review (TRR) completed before starting the test campaign.

(f) All action items from the test readiness review (if any) are answered or dispositioned.

Acceptance Criteria:

(a) Demonstrate a high-altitude abort profile requiring both SuperDraco and Draco firings with abort bottles.

(b) Demonstrate representative rendezvous and docking thruster firing sequences.

(c) Demonstrate a propulsive-assisted landing thrust profile using SuperDraco engines with Draco thrusters for roll control.

(d) Obtain data for FDIR threshold determination.

(e) Test results satisfy primary test plan objectives and support the certification plan, or a process is in place to disposition any open items.

(f) Quick-look test report delivered to NASA within 10 days of test completion.

Design Certification Review (DCR) Interim Payment Milestone
Avionics Test Bed Activation

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): May 2015

Data/Data Requirement Deliverables (DRDs) to be provided: HITL test bed schematics, HITL test bed initial power up and data checkout procedure, quick-look test report

Delivery of Data/DRDs (mo/yr): NLT 30 days before milestone (except as noted below)

Objective: [redacted]

Indicators of Milestone Readiness:

(a) Delivery of flight-like flight computer box to HITL test bed.

(b) Delivery of power box to HITL test bed.

(c) Delivery of vehicle remote-IO box to HITL test bed.

(d) Harnessing between flight computer box, power box, and vehicle remote-IO box delivered and installed on the test bed.

(e) Sufficient electrical ground support infrastructure to support power-up and box control.

(f) Flight software booting on flight computer box, power box, and vehicle remote-IO box.

(g) Flight software able to control powered loads on the power box and establish bi-directional network communication from the flight computer box to the power box and vehicle remote-IO box.

(h) Telemetry defined to demonstrate voltage being applied to individual powered loads.

(i) Telemetry defined to demonstrate bi-directional network communication.

(j) SpaceX has completed the following and delivered to NASA no later than 30 days before the activation:

a. HITL test bed schematics.

b. HITL test bed initial power up and data checkout procedure.

Acceptance Criteria:

(a) Demonstrate ability to power-up test bed.

(b) Demonstrate ability to control individual powered loads on the power box.

(c) Demonstrate end-to-end bi-directional network communication between flight computer and power box.

(d) Demonstrate end-to-end bi-directional network communication capability between flight computer and vehicle remote-IO box.

(e) Quick-look test report, showing test bed hardware and telemetry collected from demonstrations above, delivered to NASA within 10 days of test completion.

Design Certification Review (DCR) Interim Payment Milestone
Delta Critical Design Review (dCDR)

Amount: $ [redacted]
Planned Start Date and Completion Date (mo/yr): June 2015
Data/Data Requirement Deliverables (DRDs) to be provided: Final concept of operations document; detailed trajectory analysis; detailed GNC analysis; initial set of crew and ground electronic procedures; crew and ground operator display dictionary; detailed thermal analysis; detailed environmental control and life support analysis; detailed loads, environments and structural analysis; detailed wind tunnel and CFD aerodynamic reports; drawings for Dragon and Falcon 9; schematics for all Dragon, Falcon 9 and launch pad systems; DRD 107; DRD 108; DRD 205

Delivery of Data/DRDs (mo/yr): NLT 30 days before milestone

Objective: The purpose of the Delta Critical Design Review (dCDR) is to ensure that the detailed Dragon-Falcon 9 System design will satisfy all applicable requirements with adequate margins; is sufficiently mature to proceed with fabrication, assembly, integration, and test; and has completed the product verification and validation plans with NASA's approval. This design review will be co-chaired by NASA and SpaceX in accordance with our Milestone Review Plan (DRD 101). The review will cover all four elements of our crew transportation system: the Crew Dragon spacecraft, Falcon 9 launch vehicle, ground operations, and mission operations. SpaceX will present sufficiently mature designs for each of these elements to demonstrate compliance with all CCT-REQ-1130 and SSP 50808 requirements, or with NASA-approved variances. We will present details of our testing, integration and operations approach, which will need to be approved by NASA before we can proceed to the next phase of the program plan. We will also update performance margins to demonstrate that they are sufficient to complete the development efforts and we will provide updates to identified risks and their mitigations.

Indicators of Milestone Readiness: SpaceX has completed the following and provided it to NASA at least 30 days before the review:

(a) Final concept of operations document, detailing all concepts of operations from ground processing through post-landing.

(b) Detailed trajectory analysis for the Dragon-Falcon 9 ascent phase.

(c) Detailed GNC analysis for ascent aborts, rendezvous and proximity operations, and entry.

(d) Initial set of crew and ground electronic procedures (eProcs).

(e) Complete crew and ground operator display dictionary.

(f) Detailed thermal analysis.

(g) Detailed environmental control and life support analysis.

(h) Detailed loads, environments and structural analysis.

(i) Detailed wind tunnel and CFD aerodynamic reports.

(j) Drawings for Dragon and Falcon 9

(k) DRD 205 CAD model for Dragon and Falcon 9.

(l) Schematics for all Dragon, Falcon 9 and launch pad systems.

(m) DRD 107 Verification and Validation Plan

(n) DRD 108 Certification Plan

Acceptance Criteria:

(a) Critical designs for all relevant Dragon-Falcon 9 Crew Vehicle and launch pad systems and subsystems presented to sufficient level of detail.

(b) Comprehensive design presented at sufficient maturity level to show that system requirements will be met and that the program is ready to proceed with fabrication, assembly, integration, and test of all articles required for the optional period milestones.

(c) Testing approach is comprehensive and planning for system assembly integration, test, and launch site and mission operations is sufficient to progress into the next phase.

(d) Updated Integrated Master Schedule presented.

(e) Adequate technical and programmatic margins and resources exist to complete the development within budget, schedule and risk constraints.

(f) Updates to risk assessments and mitigation strategies presented.

(g) Risks to mission success are understood and plans and resources exist to effectively manage them.

(h) NASA approval obtained to proceed with fabrication, assembly, integration, and test activities to support verification and validation.

Design Certification Review (DCR) Interim Payment Milestone
Docking System Qualification Testing Complete

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): August 2015

Data/Data Requirement Deliverables (DRDs) to be provided: Docking adapter qualification plan, qualification docking adapter manufacturing work orders, quick-look test report(s)

Delivery of Data/DRDs (mo/yr): NLT 30 days before milestone (except as noted below)

Objective: [redacted]

[redacted]

Indicators of Milestone Readiness:

(a) All docking system action items from the dCDR are answered or dispositioned.

(b) Fabrication and assembly of the qualification units completed.

(c) Fabrication and checkout of SpaceX 6-DOF HITL test bed.

(d) Docking adapter qualification plan delivered to NASA at least 30 days before starting the test campaign. The test plan will include:

(1) Primary and secondary (if any) test objectives.

(2) Key differences (if any) between the test article and the flight docking adapter.

(3) Test conditions and environment.

(4) Test matrix.

(5) Instrumentation list.

(e) Docking adapter qualification test readiness review (TRR) completed before beginning the test campaign.

(f) Qualification docking adapter manufacturing work order delivered to NASA no later than 30 days before starting the test campaign.

Acceptance Criteria:

(a) Demonstrate high probability of successful soft capture through a range of expected initial conditions using the dynamic analysis model that has been anchored by testing with the JSC 6-DOF test bed.

(b) Qualification test results satisfy primary test plan objectives and support the certification plan, or a process is in place to disposition any open items.

(c) Quick-look test report(s) delivered to NASA within 10 days of test completion.

Design Certification Review (DCR) Interim Payment Milestone
Propulsive Land Landing Test Complete

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): September 2015

Data/Data Requirement Deliverables (DRDs) to be provided: Final Propulsive Land Landing Test Plan, test operation procedures, quick-look test report

Delivery of Data/DRDs (mo/yr): NLT 30 days prior before milestone (except as noted below)

Objective: SpaceX will conduct a propulsive landing test of Dragon under nominal hardware conditions. The vehicle will be dropped from an altitude sufficient to deploy parachutes and approach the landing burn under flight-like conditions. The intent of the test is to integrate the parachute, navigation, and propulsion systems into Dragon to demonstrate landing with command and control, as well as data acquisition. The test article will closely match the flight configuration's mechanical properties, such as the outer mold line for aerodynamic accuracy, maximum gross mass, moment of inertia, and center of mass location. The purpose for conducting the propulsive landing test is to demonstrate the safety and effectiveness of the Dragon propulsive landing system on flight-like hardware—including the altimeter—and to validate dynamic models for the vehicle under main parachutes. The SuperDraco assisted propulsive landing provides a fault tolerant low impact landing although Dragon can land safely under parachutes only.

Indicators of Milestone Readiness:

(a) Final Propulsive Land Landing Test Plan delivered to NASA at least 30 days before the test. The test plan will include:

  (1) Primary and secondary (if any) test objectives.

  (2) Configuration of the test unit.

  (3) Key differences between test unit and flight unit.

  (4) Instrumentation plan.

  (5) Pretest performance predications based on GNC simulations.

  (6) Test conditions and environment.

(b) Test operation procedures released at least 15 days before the test.

(c) Propulsive landing test dry runs/simulations completed.

(d) All applicable components acceptance-tested.

(e) HITL testing of flight software performed.

(f) Assembly of the propulsive landing test article completed.

(g) Non-reactive testing of the propulsive landing test article completed, including:

(1) Structural load testing.

(2) Propulsion system leak checks and functional tests.

(3) Avionics checkouts.

(h) Test readiness review completed at least 7 days before test.

(i) All action items from the test readiness review (if any) answered or dispositioned.

(j) FAA, Range Safety, and/or other applicable government approvals for the test demonstration received.

Acceptance Criteria:

(a) Propulsive landing test conducted.

(b) Test results satisfy primary test plan objectives and support the certification plan, or a process is in place to disposition any open items.

(c) Telemetry including propulsion, GNC, and avionics sensors recorded or transmitted.

(d) Environmental data for landing acoustics, induced random vibration, and landing dynamics recorded.

(e) Quick-look test report delivered to NASA within 10 days of test completion.

Design Certification Review (DCR) Interim Payment Milestone
Launch Site Operational Readiness Review

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): November 2015

Data/Data Requirement Deliverables (DRDs) to be provided: Internal design review documentation, pad operations hazard analyses, quick-look test report

Delivery of Data/DRDs (mo/yr): NLT 30 days before milestone (except as noted below)

Objective: SpaceX will demonstrate that the launch site meets CCT-REQ-1130 requirements with an acceptable level of risk for completing the Flight to ISS without Crew milestone. NASA and SpaceX personnel will evaluate the effectiveness of the pad escape system as part of a separate milestone before the Flight to ISS with Crew Milestone. This first Launch Site Operational Readiness Review will demonstrate that the launch complex is ready to support launches of the Dragon-Falcon 9 Crew Vehicle.

Indicators of Milestone Readiness:

(a) Successful completion of prerequisite SpaceX internal design reviews and hardware build for:

(1) Lightning protection system.

(2) Launch complex service structure.

(3) Pad transportation and handling ground support equipment, including the transporter-erector.

(4) Launch site fluids system, [redacted]

(5) Launch pad communications systems.

(6) Emergency subsystems, including fire-suppression system and emergency breathing gas.

(b) System safety approval for pad operations.

(1) Pad operations hazard analysis completed and delivered to NASA no later than 30 days prior to the review.

(c) Internal design review documentation delivered to NASA no later than 30 days prior to the review.

Acceptance Criteria:

(a) Pad integrity test complete.

(b) Propellant and gas flow test complete.

(c) Transporter-erector demonstration complete.

(d) Functionality of overall system successfully demonstrated.

(e) Quick look test report delivered to NASA within 10 days of test completion.

Design Certification Review (DCR) Interim Payment Milestone
Flight Test without Crew Certification Review (FTCR)
Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): December 2015

Data/Data Requirement Deliverables (DRDs) to be provided: DRD 109 Flight Test Plan for Flight to ISS without Crew; DRD 110 applicable ISS integration and CCP hazard reports; DRD 111 applicable CCT-REQ-1130 and SSP 50808 verification closure notices; DRD 113; DRD 114; Launch and reentry certification data package materials including: preliminary flight data package (PFDP) tailored for Falcon 9; orbital debris assessment reports (ODAR), end of mission plans (EOMP), reentry data package, reentry trajectory data, accident investigation plan, Dragon first responders guide, Dragon reentry flight rules, and recovery operations summary; and Applicable hardware and software items in Appendix G of SSP 50964.

Delivery of Data/DRDs (mo/yr): NLT 45 days before milestone

Objective: The FTCR will certify the design and safety of the Flight to the ISS without Crew. SpaceX will complete relevant CCT-REQ-1130 and all SSP 50808 ISS integration activities for the Dragon-Falcon 9 Crew Vehicle, ground segment, and mission operation elements in preparation for a mission to the ISS without crew.

Partial certification to CCT-REQ-1130 will be focused on those VCNs and hazard reports which ensure adequate safety provisions are in place and risks are acceptable for the ascent, and the entry, descent and landing phases of flight. The review is a critical gate on the road to full certification and provides NASA the opportunity to assess safety risks and gain confidence in the validation activities associated with the Flight Test to the ISS without crew. [redacted]

A key predecessor to this FTCR will be the completion of ISS integration. ISS integration is the set of activities required to ensure that ISS requirements (per SSP 50808, ISS to COTS IRD) have been met; hardware and software needed to interface with the ISS has been completed; and joint on-orbit integration operations plans and products have been finalized. [redacted]

Indicators of Milestone Readiness:

SpaceX has completed the following and provided NASA with all data products 45 days before FTCR:

(a) Successful completion of ISS Post Qualification Review (PQR) including:

(a) Delivery of applicable hardware and software items in SSP 50964 (Visiting Vehicle ISS Integration Plan), Appendix G with

(1) Path forward for open items jointly agreed to between SpaceX and NASA.

(2) Delivery and closure of applicable SSP 50808 Verification & Validation products (all requirements less standard open items).

(3) Path forward for open items jointly agreed to between SpaceX and NASA.

(4) Delivery and closure of applicable ISS integration hazard reports and completion of the Phase III Safety Review Panel associated with SSP 50808.

(5) Approval from the ISS Program and PQR Board to approach and dock to the ISS.

(b) SpaceX has completed the following and provided it to NASA at least 45 days before the review:

(1) Preliminary flight data package (PFDP) tailored for Falcon 9
(2) Orbital debris assessment report (ODAR)
(3) End of mission plans (EOMP)
(4) Reentry data package
(5) Reentry trajectory data
(6) Accident investigation plan
(7) Dragon first responders guide
(8) Dragon reentry flight rules
(9) Recovery operations summary
(10) Applicable CCT-REQ-1130 hazard reports in accordance with DRD 110 Hazard Reports
(11) Applicable CCT-REQ-1130 VCNs in accordance with DRD 111 Verification Closure Notices (VCN)
(12) DRD 113 Range Safety Data Documentation
(13) DRD 114 CTS Data Input for NASA Integration and Independent Verification and Validation

(c) Delivery of all items needed for the flight operations review.

(d) Completion of applicable flight hardware component acceptance testing.

(e) Completion of applicable hardware qualification testing.

(f) Most vehicle integrated system testing and as-built inspections completed.

(g) Initial flight test plan submitted to NASA.

Acceptance Criteria:

(a) Approval from the Commercial Crew Program to ensure appropriate safety risk of the flight test to the ISS without crew has been satisfied based on the VCN and Hazard Report closures.

(b) Open items reviewed with NASA.

(c) Risks associated with the uncrewed missions to the ISS reviewed with NASA.

(d) NASA and SpaceX management jointly provide authority to proceed for Flight to ISS without Crew milestone.

Design Certification Review (DCR) Interim Payment Milestone
ECLSS Integrated Test Complete

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): February 2016

Data/Data Requirement Deliverables (DRDs) to be provided: ECLSS Module Integrated Test Plan, ECLSS module and GSE schematics, test operation procedures, quick-look test report

Delivery of Data/DRDs (mo/yr): NLT 30 days before milestone (except as noted below)

Objective: [redacted]

Indicators of Milestone Readiness:

(a) ECLSS module test unit completed, including all required ECLSS subsystems, such as:

(1) CO_2 scrubbing system and fans.

(2) Oxygen delivery system.

(3) Dehumidifier system.

(b) ECLSS module GSE completed.

(1) Flight-like avionics interfaces.

(2) GSE thermal control systems.

(3) GSE oxygen consumables.

(4) GSE vacuum system.

(c) Checkout testing of the ECLSS module completed, including:

(1) Leak checks of the pressure section, oxygen system and TCS.

(2) Avionics checkouts.

(d) Final test plan completed and submitted to NASA at least 30 days before the test. The test plan will contain:

(1) Primary and secondary (if any) test objectives.

(2) Configuration of the test unit.

(3) Key differences between test unit and flight unit.

(4) Instrumentation plan.

(e) Test operation procedures released at least 15 days before the test.

(f) Test readiness review completed at least 7 days before the test.

(g) ECLSS module and GSE schematics delivered to NASA no later than 30 days prior to the test.

Acceptance Criteria:

(a) Test results satisfy primary test plan objectives, or a process is in place to disposition any open items.

(b) Quick-look report provided to NASA within 10 days of the test, including the following information:

(1) Plots of predicted versus measured performance of all applicable ECLSS subsystems.

(2) Description of major anomalies.

(3) Photographic coverage.

Design Certification Review (DCR) Interim Payment Milestone
Flight to ISS without Crew

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): March 2016

Data/Data Requirement Deliverables (DRDs) to be provided: DRD 109 Flight to ISS without Crew Final Test Plan, DRD 209 Postflight Assessment Report

Delivery of Data/DRDs (mo/yr): NLT 30 days before milestone (except as noted below)

Objective: SpaceX will conduct a flight test of the Dragon-Falcon 9 Crew Vehicle without crew after completion of ISS Integration and before Crew Dragon certification. The mission configuration will closely match that of the subsequent Flight to ISS with Crew milestone, which will be the first crewed mission to the ISS. The purpose of this test flight without crew is to provide an early demonstration and risk reduction of the Dragon-Falcon 9, ground segment, and mission operations elements. We will use the data from this flight test to support Crew System certification products, providing mature deliverables informed by flight data.

The key risks mitigated by objectives of this flight test are related to the following:

- Proximity operations.
  - [redacted]
- Gathering engineering data.
  - [redacted]
- Design validation.
  - [redacted]

- Demonstrate propulsive-assisted land landing concept of operations.
- Demonstrate nosecone mechanism.



Indicators of Milestone Readiness:

SpaceX has completed the following:

(a) Flight Test without Crew Certification Review (FTCR) completed.

(b) Open issues from FTCR successfully closed.

(c) Final Dragon-Falcon 9 Crew Vehicle HITL and integrated system testing completed.

(d) Vehicle level thermal vacuum and acoustic testing of Dragon successfully completed

(e) All preflight preparations successfully completed.

(f) DRD 109 Flight to ISS without Crew Final Test Plan submitted to NASA at least 30 days before the launch.

(g) Flight readiness review (FRR) held no later than 7 days before the test.

(h) All action items from the flight test readiness review (if any) answered or dispositioned.

Acceptance Criteria:

(a) Successful launch and on-orbit deployment of the Dragon-Falcon 9 Crew Vehicle.

(b) Successful docking of Crew Dragon to the ISS.

(c) Successful departure, entry and landing of Crew Dragon.

(d) All mission anomalies identified (if any).

(e) Test results satisfy primary test plan objectives and support the certification plan, or a process is in place to disposition any open items.

(f) DRD 209 Postflight Assessment Report initially delivered to NASA within 14 days of landing, with the final report delivered within 30 days after landing.

(g) A plan and schedule have been defined for the resolution of all actions and open items resulting from the postflight findings. All to be determined and to be resolved items are clearly identified with acceptable plans and schedules for their disposition. All open items to be closed by the design certification review (DCR).

Design Certification Review (DCR) Interim Payment Milestone
Parachute Qualification Complete

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): April 2016

Data/Data Requirement Deliverables (DRDs) to be provided: Parachute Qualification Test Plans, quick-look test reports

Delivery of Data/DRDs (mo/yr): NLT 30 days before Milestone (except as noted below)

Objective: SpaceX will conduct a series of tests on the parachute system in nominal and off-nominal configurations, enveloping conditions for abort and nominal entry scenarios. As described in DRD 108 Verification and Validation Plan, these tests will demonstrate that the design and build of the Crew Dragon parachute system meets the intent of Section 4 of JSC-65985, Requirements for Human Spaceflight for the Trailing Deployable Aerodynamic Decelerator (TDAD) System. Complete human-rating of the parachute system will leverage these tests along with additional analysis, inspection and lessons learned from the pad and in-flight abort tests conducted during CCiCap. The Parachute Qualification milestone will be completed after the Flight to ISS without Crew milestone because the latter does not require this level of human-rating for a flight without crew, and any in-flight observations from that test flight can be used to inform the test plan for parachute qualification.

The Dragon parachute system is critical to the safety of crew members during all missions. Its purpose is to stabilize and decelerate the vehicle to an appropriate descent rate for a safe land landing for all mission cases. The system must not only decelerate the Dragon from the extreme velocities of orbital entry, but must also be able to quickly establish aerodynamic control of the vehicle for aborted launches, the strictest of these scenarios being an emergency event at the launch pad. The parachutes make up a sophisticated system subject to many failure modes both known and unknown, high and potentially uncertain loads, and a wide range of initial conditions. As such, multiple tests in a full scale and flight-like configuration are required to demonstrate and observe aspects such as redundancy effectiveness, performance dispersions, and structural integrity.

Indicators of Milestone Readiness:

(a) NASA approval of Crew Dragon Verification Plan, including testing in support of certification of the Dragon parachute system.

(b) Full-scale test unit(s) prepared with relevant characteristics (e.g., mass, moment of inertia, and outer mold line) as similar to the flight configuration as possible.

(c) Any needed approvals for use of air/land space to run each test.

(d) Test plans completed and submitted to NASA at least 30 days before test. Test plans will contain:

(1) Primary and secondary (if any) test objectives.

(2) Configuration of the test unit.

(3) Key differences between test unit and flight unit.

(4) Instrumentation plan.

(5) Test conditions and environment.

(e) Test readiness reviews (TRR) completed no later than 7 days before the test.

(f) All action items from the test reviews (if any) answered or dispositioned.

Acceptance Criteria:

(a) Complete each physical test of the Dragon parachute system as outlined in the Crew Dragon Verification Plan.

(b) Test results satisfy primary test plan objectives.

(c) Quick-look test reports provided to NASA within 10 days of test completion, including the following:

(1) Description of major anomalies.

(2) Plots of acceleration and angular rates.

(3) Photographic and video coverage.

Design Certification Review (DCR) Interim Payment Milestone
Space Suit Qualification Testing Complete

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): May 2016

Data/Data Requirement Deliverables (DRDs) to be provided: Space Suit Qualification Test Plan, qualification space suit manufacturing work order, quick-look test report

Delivery of Data/DRDs (mo/yr): NLT 30 days before milestone (except as noted below)

Objective: SpaceX will conduct a series of tests on the SpaceX space suit to qualify the design for flight. This testing will support the verification products as outlined in the DRD 108 V&V plan to ensure the suit meets functional and performance requirements, including structural, leakage, acoustic, thermal, and human factors requirements. Crew-in-the-loop (CITL) testing (e.g., vacuum chamber testing) will be performed to verify performance of the suit with a suited subject. This testing will support space suit qualification and demonstrate readiness for the Flight to ISS with Crew.

Space suit qualification will consist of stand-alone and CITL testing to verify suit performance. A qualification suit will be used for testing at various facilities, as required.

Testing will include:

1. Structural pressure testing to verify the ability of the suit to maintain structural integrity with appropriate factors of safety.
2. Leakage testing to verify the suit leak rate.
3. CITL vacuum chamber testing for the full cabin depressurization duration.
4. Performance testing to verify the suit's ability to washout carbon dioxide from the suited subject's oral nasal region.
5. Pressurized and unpressurized mobility testing with a suited subject to demonstrate that the crew can perform required tasks in-flight.
6. Suit donning testing to verify the crew can don their suits without assistance and within the time required to support the SpaceX concept of operations, in a representative 1-g environment.
7. Acoustic testing to verify the acoustic attenuation of the suit helmet.
8. Interface testing to verify the suit interfaces properly with other Dragon hardware, including seats, restraints, and umbilical connections.

Details of the testing will be defined in the Space Suit Qualification Test Plan.

In any instances where evaluations include pressurized suit testing or for any testing that would pose safety hazards to NASA personnel, SpaceX shall submit test plans, procedures and hazard analyses to NASA for approval before the start of testing.

Indicators of Milestone Readiness:

(a) Qualification suit build completed, including:

(1) All suit elements, such as pressure garment, helmet, gloves and boots.

(2) Representative suit pressure control hardware.

(b) Test readiness review held with NASA no less than 7 days before the start of qualification testing. The purpose of the meeting is to determine readiness to begin qualification testing.

(c) Qualification test plan(s) completed and submitted to NASA at least 30 days before the test readiness review. The test plan(s) will include:

(1) Primary and secondary (if any) test objectives.

(2) Test description, including test levels and durations (if applicable).

(3) Configuration of the suit qualification article.

(4) Key differences between the qualification suit and the flight suit.

(5) Safety assessments of test setup for all pressurized suit testing or any testing that would pose safety hazards to NASA personnel

(d) All action items from the test readiness review answered or dispositioned.

(e) NASA approval to proceed with testing on a test-by-test basis, such that testing can begin for tests NASA has approved.

(f) Qualification space suit manufacturing work orders delivered to NASA no later than 30 days prior to the test.

Acceptance Criteria:

(a) All tests identified in the Space Suit Qualification Test Plan completed.

(b) Test results satisfy primary test plan objectives and support the human certification plan, or a process is in place to disposition any open items.

(c) Quick-look test report provided to NASA within 10 days of test completion, including the following:

(1) Description of major anomalies.

(d) Summary of test results showing that the design and performance of the suit meets all relevant requirements.

Design Certification Review (DCR) Interim Payment Milestone
Launch Site Operational Readiness Review for Crew

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): June 2016

Data/Data Requirement Deliverables (DRDs) to be provided: Crew Ingress/Egress Demonstration Test Plan, internal design review documentation, launch complex blast damage area assessment, blast pressure wave analysis and survivability assessment, pad operations hazard analyses, system safety requirements verification, demonstration test report

Delivery of Data/DRDs (mo/yr): NLT 30 days before milestone (except as noted below)

Objective: SpaceX will demonstrate the readiness of the launch complex crew ingress/egress system to show that the system meets all CCT-REQ-1130 requirements with acceptable risk. NASA and SpaceX personnel will evaluate the effectiveness of the pad ingress/egress system. All NASA and SpaceX evaluators and subject matter experts will provide comments and feedback. The demonstration will occur at the launch site and will cover all ground systems associated with nominal and emergency crew ingress/egress operations at the launch complex. The demonstration will support the human certification plan and may be split into multiple stages depending on vehicle readiness. For example, the test could be split to use a ground-based capsule simulator to evaluate ingress/egress timing, and a separate test for pad escape via gantry.

Indicators of Milestone Readiness:

(a) Demonstration test plan developed and submitted to NASA for review at least 30 days before the crew ingress/egress demonstration. This plan will outline the operations to be simulated, the procedures to be used, and the overall timeline of the demonstration.

(b) Crew ingress/egress demonstration test readiness review completed at least 7 days before test.

(c) All action items from the demonstration test readiness review (if any) answered or dispositioned.

(d) Electronic copy of the following technical products made available for NASA review at least 15 days before the review:

(1) Updated concept of operations for ground operations, if applicable.

(2) Launch complex blast damage area assessment.

(3) Blast pressure wave analysis and survivability assessment.

(e) Successful completion of prerequisite SpaceX internal design reviews and hardware build for:

(i) Lightning protection system.

(ii) Launch complex service structure, including tower, elevator, Crew Dragon access arm and white room.

(iii) Crew emergency egress system.

(iv) Pad transportation and handling ground support equipment, including transporter-erector.

(v) Launch pad communications systems.

(vi) Launch control center.

(vii) Emergency subsystems, including fire-suppression system and emergency breathing gas.

(f) Delivery of internal design review documentation to NASA at least 15 days before the review.

(g) System safety approval for pad operations.

(i) Pad operations hazard analysis completed and delivered to NASA 15 days before the review.

(ii) System safety requirements verification (for ingress/egress ground systems, only) completed and delivered to NASA 15 days before the review.

Acceptance Criteria:

(a) Crew ingress and egress operations demonstrated to be safe and effective. Emergency pad egress shown to meet all relevant NASA and SpaceX requirements.

(b) Human factors assessment performed by NASA and/or SpaceX experts.

(c) Ground system designs for ingress/egress meet requirements at an acceptable level of risk.

(d) Functionality of overall system successfully verified via demonstration (when available), or otherwise by analysis, test or inspection.

(e) Operational concept is technically sound and human factors included (where appropriate).

(f) Certification objectives have been met or a process is in place to disposition any open items.

(g) Demonstration test report generated and delivered to NASA.

Design Certification Review (DCR) Milestone

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): July 2016

Data/Data Requirement Deliverables (DRDs) to be provided: DRD 002, DRD 103, DRD 109, DRD 110, DRD 111, DRD 112, DRD 113, DRD 203

Delivery of Data/DRDs (mo/yr): NLT 45 days before milestone reference **DRD 101 Milestone Review Plan**

Objective: DCR acceptance criteria shall be met before any crewed test flights.

At a NASA and Contractor co-chaired DCR, the Contractor shall:

(a) Demonstrate that the Crew Transportation System (CTS) and operations meet all applicable requirements (exceptions must be preapproved by the Commercial Crew Program/ISS Program (CCP/ISSP)), as defined in CCT-REQ-1130, *ISS Crew Transportation and Services Requirements Document,* and SSP 50808, *ISS to Commercial Orbital Transportation Services (COTS) Interface Requirements Document (IRD)* in order to meet the ISS Design Reference Mission *(DRM)* within CCT-DRM-1110, *CTS DRM.*

(b) Provide evidence that it has met all applicable requirements (exceptions must be preapproved by the CCP/ISSP) through the implementation of its baselined management and certification plans and processes required in CCT-PLN-1120, *Crew Transportation Technical Management Processes.*

(c) Demonstrate schedule performance in accordance with the **DRD 002 Integrated Master Plan and Integrated Master Schedule**.

(d) Define top safety, technical, cost, and schedule risks.

Upon meeting the DCR Acceptance Criteria defined below, NASA will permit the Contractor to proceed to a Flight Test Readiness Review (FTRR).

Indicators of Milestone Readiness:
The Contractor has completed the following and provided to NASA:

(a) The **DRD 103 Design Certification Review Data Package.**

(b) The **DRD 112 Certification Data Package** including but not limited to:

(1) All **DRD 111 Verification Closure Notices (VCNs)** demonstrating that the CTS requirements have been met. (All VCNs shall be closed unless exceptions are preapproved by the CCP/ISSP).

(2) The hazard analysis and **DRD 110 Hazard Reports** have been approved by NASA.

(c) All management and certification plans and processes required in CCT-PLN-1120 have been completed.

(d) ISS Integration per SSP 50964, *Visiting Vehicle ISS Integration Plan*, including the Flight Operations Review and the ISS Phase III Safety Review have been completed. Forward work is scheduled and approved by NASA.

(e) The **DRD 002 Integrated Master Plan and Integrated Master Schedule.**

(f) The **DRD 113 Range Safety Data Documentation.**

(g) The **DRD 203 Vehicle Interface Definition Document (IDD).**

(h) An assessment of the top safety risks and documentation of the management and acceptance of risk including, but not limited to:

(1) Most recent results of the Probabilistic Safety Analysis (PSA) that identify the integrated safety and mission assurance risk of the baseline design, and individually identifies top risk contributors.

(2) An assessment of crew survival capability of the baseline design in accordance with CCT-PLN-1120.

(i) The top programmatic risks have been identified and assessed.

(j) Documentation substantiating all Review Item Dispositions (RIDs) and actions from design reviews, verification reviews, and Certification Baseline Review (CBR) are closed.

Acceptance Criteria:

(a) The **DRD 112 Certification Data Package** has been approved by NASA.

(1) All applicable **DRD 111 VCNs** have been approved by NASA. (All VCNs relevant to crewed flight test will be approved by NASA with acceptable open work).

(2) The design provides crew survival capability.

(3) Operational limits and constraints have been implemented and verified.

(4) Operational roles and procedures have been defined for crew, mission team and mission management.

(b) An **DRD 002 Integrated Master Plan and Integrated Master Schedule** has been approved.

(c) The top safety risks are identified, assessed, and clearly communicated. Plans, processes, and appropriate resources necessary to effectively manage the risks are in place.

(1) Major risks to crew safety and mission success have been identified, quantified, and integrated in a PSA.

(2) Risk mitigation strategies associated with the CTS design baseline, cost and schedule have been identified and agreed upon by NASA.

(d) The top programmatic risks have been identified. Plans, processes, and appropriate resources necessary to effectively manage the risks are in place.

(e) All RIDs and actions from design reviews, verification reviews and CBR are closed. All To be Determined (TBD) and To be Resolved (TBR) items are clearly identified with acceptable plans and schedules for their disposition and have been submitted.

(f) A plan and schedule have been defined for the resolution of all actions and open items resulting from the DCR. All TBD and TBR items are clearly identified with acceptable plans and schedules for their disposition.

Flight Test Readiness Review (FTRR) Interim Milestone

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): September 2016

Data/Data Requirement Deliverables (DRDs) to be provided: DRD 104, DRD 110, DRD 111, DRD 112,

Delivery of Data/DRDs (mo/yr): NLT 45 days before milestone reference **DRD 101 Milestone Review Plan**

Objective: For each crewed flight test(s), the Contractor shall conduct an FTRR that demonstrates readiness to conduct a crewed flight test and defines a risk baseline for crewed flight test activities.

Indicators of Milestone Readiness:
The Contractor has completed the following and provided to NASA:

(a) All data and documentation identified in CCT-PLN-1120, *Crew Transportation Technical Management Processes,* Appendix F, *CTS FRR Milestone Data*, as the **DRD 104 FTRR Data Package**.

(1) Approval of any new, open or changes to applicable **DRD 111 Verification Closure Notices (VCNs), DRD 110 Hazard Reports,** and **DRD 112 Certification Data Package**.

(2) Documentation that all acceptance, checkout and integration testing has been completed.

(3) Documentation of flight specific products.

(4) Documentation that the launch site, Range, recovery and tracking and data support resources have committed to launch.

(5) Documentation that landing site recovery support and resources have committed to landing.

(6) Documentation that all operational supporting and enabling capabilities (e.g., facilities, equipment, documents, updated databases) necessary for nominal and contingency operations have been tested and delivered/installed at the site(s) necessary to support operations.

(7) Documentation that plans, processes, procedures and training for nominal and contingency operations for the Crew Transportation System (CTS) have been completed to support operations.

(8) Documentation that systems hardware, software, personnel, processes and procedures are in place to support operations.

(b) The Contractor, its subcontractors, suppliers and team members have provided flight readiness endorsements demonstrating that they have met requirements in accordance with the Contractor's management processes.

(c) International Space Station (ISS) Stage Operational Readiness Review (SORR) has been completed and the ISS is ready to accept the Visiting Vehicle and crew for flight tests to ISS.

(1) Documentation of residual mission risks and related analyses for acceptance.

(d) All open actions from Design Certification review (DCR) and SORR have been closed.

Acceptance Criteria:

(a) The **DRD 104 FTRR Data Package** has been presented and accepted by NASA.

(b) All changes, modifications and anomalies since DCR have been resolved and resolutions have been accepted by NASA.

(c) Mission management team, crew, and mission support team have been identified, have been trained, and are in place.

(d) The plan and schedule of preplanned forward work has been accepted by NASA.

(e) Any open work or constraints to launch are identified and closeout plans and schedules are in place and supportable.

(f) NASA has accepted the flight specific products.

(g) Launch Site, Range, and recovery support organizations have committed to launch.

(h) Landing site support and resources have committed to landing.

(i) NASA has accepted residual flight test risks.

Certification Review (CR) Interim Payment Milestone
Flight to ISS with Crew

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): October 2016

Data/Data Requirement Deliverables (DRDs) to be provided: DRD 109 Flight to ISS with Crew Final Test Plan, DRD 209 Postflight Assessment Report

Delivery of Data/DRDs (mo/yr): NLT 30 days before milestone (except as noted below)

Objective: As the final validation test before proceeding with the Crew Vehicle Operations Readiness Review (ORR), SpaceX will conduct a second test flight of the Dragon-Falcon 9 Crew System, this time with crew, after NASA approval of the Design Certification Review and Flight Test Readiness Review. The purpose of this test is to provide an early demonstration and risk reduction of the Dragon-Falcon 9 System for operational missions. We will use the data from this flight to support the creation of mature Crew Dragon certification products and to demonstrate readiness for post-certification missions. This flight test will be a short-duration mission of approximately 14 days.

The key risks mitigated by this flight test are related to the following CITL operations:

- Proximity operations.
    - Proximity operations with the new Dragon-to-ISS communications system.
    - Autonomous V-bar approach and rendezvous.
    - Crew monitoring capability during autonomous docking operations.
    - Crew ingress and egress to ISS.
- Gathering engineering data gathering.
    - Additional data for thermal model validation.
    - Additional aerodynamic data for modified Dragon OML during entry and landing.
    - Additional flight data for loads and dynamic environments.
    - Data for ECLSS performance with crew onboard during all phases of flight.
- Design validation.
    - Crew manual control of vehicle attitude and translation.
    - Nominal operation of spacesuits.
    - The ability of the crew to adequately monitor vehicle performance and command vehicle systems.

Indicators of Milestone Readiness:

SpaceX has met the following criteria:

(a) Design Certification Review (DCR) completed.

(b) Open issues from the Flight Test Readiness Review successfully closed.

(c) Received FAA, Range Safety and/or other applicable government approvals for the test demonstration.

(d) Final Dragon-Falcon 9 Crew Vehicle HITL and integrated system testing completed.

(e) All preflight preparations successfully completed.

(f) All crew and ground operator training completed and all personnel certified for flight.

(g) DRD 109 final flight test plan submitted to NASA at least 30 days before the launch. NASA comments on the test plan provided to SpaceX no less that 15 days before launch.

Acceptance Criteria:

(a) Successful launch and on-orbit deployment of the Dragon-Falcon 9 Crew Vehicle.

(b) Successful docking of the Crew Dragon system to the ISS.

(c) Successful ingress of the crew to ISS.

(d) Successful departure, entry and landing of Crew Dragon.

(e) Successful demonstration of crew manual flight control, crew commanding and crew monitoring functions.

(f) Safe return of crew to Earth.

(g) All mission anomalies identified (if any).

(h) Test results satisfy primary test plan objectives and support the certification plan, or a process is in place to disposition any open items.

(i) DRD 209 Postflight Assessment Report delivered to NASA within 14 days of landing, the final report delivered within 30 days after landing.

(j) A plan and schedule have been defined for the resolution of all actions and open items resulting from the postflight findings. All to be determined and to be resolved items are clearly identified with acceptable plans and schedules for their disposition. All open items to be closed by the Operational Readiness Review (ORR).

Operations Readiness Review (ORR) Interim Milestone

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): January 2017

Data/Data Requirement Deliverables (DRDs) to be provided: DRD 105, DRD 110, DRD 111, DRD 112,

Delivery of Data/DRDs (mo/yr): NLT 45 days before milestone reference **DRD 101 Milestone Review Plan**

Objective: At a NASA and Contractor co-chaired Operations Readiness Review (ORR), the Contractor shall demonstrate that the actual Crew Transportation System (CTS) system characteristics and the procedures used in operations reflect the deployed state of the CTS. The ORR evaluates all project and support (flight and ground) hardware, software, personnel, and procedures to ensure flight and associated ground systems are in compliance with program requirements and constraints.

An ORR occurs upon successful completion of the crewed test flight to International Space Station (ISS). Upon meeting the ORR Acceptance Criteria defined below, NASA will accept operations readiness of the system for Post Certification Missions (PCMs).

Indicators of Milestone Readiness:
The Contractor has completed the following and provided to NASA:

(a) The **DRD 105 Operations Readiness Review (ORR) Data Package.**

(b) Any updates to the **DRD 112 Certification Data Package.**

(c) Any new, open or changed **DRD 111 Verification Closure Notices (VCNs)** and **DRD 110 Hazard Reports.**

(d) Approval of closure of action items from Flight Test Readiness Review(s) (FTRR(s)), Design Certification Review(s) (DCR(s)) and previous reviews.

(e) Documentation substantiating that all validation testing has been completed.

(f) Documentation providing evidence that failures and anomalies have been resolved and the results incorporated.

(g) Documentation that all operational supporting and enabling capabilities (e.g., facilities, equipment, documents, updated databases) necessary for nominal and contingency

operations have been tested and delivered/installed at the site(s) necessary to support recurring operations.

(h) Documentation that plans, procedures and training for nominal and contingency operations for the CTS have been completed to support recurring operations.

(i) Documentation that systems hardware, software, personnel, and procedures are in place to support recurring operations.

(j) An assessment of the top safety risks and documentation of the management and acceptance of risk including but not limited to:

(1) Most recent results of the Probabilistic Safety Analysis (PSA) that identify the integrated safety and mission assurance risk of the baseline design, and individually identifies top risk contributors.

(2) An assessment of crew survival capability of the baseline design in accordance with CCT-PLN-1120, *Crew Transportation Technical Management Processes*.

(k) The top programmatic risks have been identified and assessed.

(l) Documentation substantiating all Review Item Dispositions (RIDs) and actions from design reviews, verification reviews, DCR(s), and FTRR(s) are closed.

Acceptance Criteria:

(a) The CTS, including any enabling products, is determined to be ready to be placed in a recurring operations status.

(1) NASA has approved the updated **DRD 112 Certification Data Package** including any remaining open **DRD 111 Verification Closure Notices** and **DRD 110 Hazard Reports.**

(2) NASA has approved closure of action items from DCR and previous reviews.

(3) NASA has accepted documentation as evidence that all validation testing has been completed.

(4) NASA has accepted documentation as evidence that failures and anomalies have been resolved and the results incorporated.

(5) NASA has accepted documentation that all operational supporting and enabling capabilities (e.g., facilities, equipment, documents, updated databases) necessary for nominal and contingency operations have been tested and delivered/installed at the site(s) necessary to support sustaining operations.

(6) NASA has accepted documentation that all plans, procedures and training for nominal and contingency operations for the CTS have been completed to support sustaining operations.

(b) NASA has accepted documentation that systems hardware, software, personnel, and procedures are in place to support operations.

(c) The top safety risks for Post Certification Missions are identified, assessed, and clearly communicated. Plans, processes, and appropriate resources necessary to effectively manage the risks are in place.

(1) Major risks to crew safety and mission success have been identified, quantified, and integrated in a PSA.

(2) Risk mitigation strategies associated with the CTS design baseline, cost and schedule have been identified and agreed upon by NASA.

(d) The top programmatic risks have been identified. Plans, processes, and appropriate resources necessary to effectively manage the risks are in place.

(e) A plan and schedule have been defined for the resolution of all actions and open items resulting from the ORR. All To be Determined (TBD) and To be Resolved (TBR) items are clearly identified with acceptable plans and schedules for their disposition.

Certification Review (CR) Milestone

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): April 2017

Data/Data Requirement Deliverables (DRDs) to be provided: DRD 106, DRD 111, DRD 112,

Delivery of Data/DRDs (mo/yr): NLT 45 days before milestone reference **DRD 101 Milestone Review Plan**

Objective: At a NASA chaired review, the Contractor shall provide evidence that the CTS has met all NASA requirements identified in Attachment J-01, *Integrated Crew Transportation System (CTS) Requirements*. The Contractor shall also provide documentation of the crew safety and mission assurance risks associated with the CTS.

Indicators of Milestone Readiness:
The Contractor has completed the following and provided to NASA:

(a) The **DRD 106 Certification Review Milestone Data Package**

(b) The **DRD 112 Certification Data Package.**

(c) Documentation of results from all flight tests, Operations Readiness Review (ORR), production acceptance testing and closure of any open requirements from Design Certification Review(s) (DCR(s)).

(d) An assessment of the top safety risks and documentation of the management and acceptance of risk including but not limited to:

(1) Most recent results of the Probabilistic Safety Analysis (PSA) that identify the integrated safety and mission assurance risk of the baseline design, and individually identifies top risk contributors.

(2) An assessment of crew survival capability of the baseline design.

(e) The top programmatic risks have been identified and assessed.

(f) Documentation substantiating all Review Item Dispositions (RIDs) and actions from design reviews, verification reviews, DCR(s), Flight Test Readiness Review(s) (FTRR(s)) and ORR are closed.

Acceptance Criteria:

(a) CTS Certification recommendation has been approved including **DRD 112 Certification Data Package.**

(b) Results from risk assessment have been accepted by NASA.

(c) Closure of all open actions from previous reviews have been approved by NASA.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
	1 2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO	5. PROJECT NO. *(If applicable)*
000001	See Block 16C		

6. ISSUED BY	CODE	7. ADMINISTERED BY *(If other than Item 6)*	CODE
KSC		KSC	

NASA/John F. Kennedy Space Center
Office of Procurement
Mail Code OP-MS
Kennedy Space Center FL 32899

NASA/Kennedy Space Center
Office of Procurement
Mail Code OP-MS
Kennedy Space Center FL 32899

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and ZIP Code)*

SPACEX
1 ROCKET RD
HAWTHORNE CA 90250-6844

(x)	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED *(SEE ITEM 11)*
X	10A. MODIFICATION OF CONTRACT/ORDER NO. NNK14MA74C
	10B. DATED *(SEE ITEM 13)* 09/16/2014

CODE	3BVL8	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 _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT 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 telegram or letter, provided each telegram or letter 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 ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. 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 NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 52.233-3, Protest After Award
	D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor is not x 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.)*

The purpose of this bilateral modification is to revise the following within Attachment J-03, Appendix A:

- Certification Base Line Review (CBR) Interim Milestone "Planned Start Date and Completion Date" changed from November 2014 to December 2014.

As a result of the above, the following page is deleted and replacement attached to this modification: Attachment J-03, Appendix A, pages 2.

Continued ...

Except as provided herein, all terms and conditions of the document referenced in Item 9 A 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)*
Julie A. Jiru, Contracts Officer	Brian S. Hinerth
15B. CONTRACTOR/OFFEROR [redacted] *(Signature of person authorized to sign)*	15C. DATE SIGNED 26NOV14
16B. UNITED STATES OF AMERICA [redacted]	16C. DATE SIGNED 12-1-2014

NAME OF OFFEROR OR CONTRACTOR
SPACEX

ITEM NO. (A)	SUPPL ES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	In consideration of the modification(s) agreed to herein, and described as complete equitable adjustments in delivery schedule for the Contractor's Certification Baseline Review (CBR) Interim Milestones, the Contractor hereby releases the Government from any and all liability under this contract for further equitable adjustments attributable to such facts or circumstances giving rise to the Proposed delivery schedule adjustment. Payment Terms: Net 15 days				

Certification Baseline Review (CBR) Interim Milestone

Amount: $ [redacted]

Planned Start Date and Completion Date (mo/yr): December 2014

Data/Data Requirement Deliverables (DRDs) to be provided: DRD 001, DRD 002, DRD 101, DRD 102, DRD 107, DRD 108, DRD 109, DRD 201, DRD 203, DRD 205, DRD 206, Key Performance Design Parameters Matrix, SSP 50833 COTS Cargo Interface Requirements Document, SSP 50977 ISS to COTS ICD for SpaceX Commercial Crew Transpiration System, Joint Integrated Verification Test Plan (JiVTP), BDEALS, BSHEALS, Concept of Operations Document, Crew Dragon Design Document, Falcon 9 Design Document, Dragon Software Requirements Baseline Document, Falcon Software Requirements Baseline Document, Software Design and Capabilities Baseline, Crew Dragon Schematics, Falcon 9 Schematics, Crew Dragon Bill of Materials, Falcon 9 Bill of Materials, Crew Dragon Thermal Analysis, Falcon 9 CAD Models, Crew Dragon CAD Models, System Safety Process, Human Error Analysis, Integrated Probabilistic Safety Analysis, Hazard Report Status, Fault Tolerance Assessment, Crew Survival Strategy, Margin Management Report, Crew Training Template, Crew Master Task List, Crew Task Analysis, Crew Workload and Usability Evaluations, Crew-In-The-Loop Test Plan, Risk Management Status, Final Management Plans and Products

Delivery of Data/DRDs (mo/yr): NLT 45 days before milestone reference **DRD 101 Milestone Review Plan**

Objective: At a NASA and Contractor co-chaired Certification Baseline Review (CBR) completed within ninety (90) days of contract start, the Contractor shall:

(a) Identify the Baseline requirements, including the allocation to the Elements and Subsystems of the CTS, incorporating the results of NASA's guidance provided under Certification Products Contract (CPC) (if applicable), which meet NASA's requirements defined in CCT-REQ-1130, *ISS Crew Transportation and Services Requirements Document* and SSP 50808, *International Space Station (ISS) to Commercial Orbital Transportation Services (COTS) Interface Requirements Document*.

(b) Identify the current Crew Transportation System (CTS) design baseline.

(c) Document management plans and products incorporating the results of NASA's disposition provided under Certification Products Contract (CPC) (if applicable), to meet requirements in the CCT-PLN-1120, *Crew Transportation Technical Management Processes*.

(d) Define the plan and schedule to complete Design, Development, Test, and Evaluation (DDTE) and certification for the CTS design, production, and operations.

(e) Define top safety, technical, cost and schedule risks based on most current CTS design.