SPACE ACT AGREEMENT
BETWEEN
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AND
SPACE EXPLORATION TECHNOLOGIES CORP.
FOR
COMMERCIAL ORBITAL TRANSPORTATION SERVICES DEMONSTRATION
(COTS)

BACKGROUND

A. NASA has established the Commercial Crew/Cargo Project Office at the Johnson Space Center as part of the Exploration Systems Mission Directorate. The objectives of the Commercial Crew/Cargo Project are to:

- implement U.S. Space Exploration policy with an investment to stimulate commercial enterprises in space,
- facilitate U.S. private industry demonstration of cargo and crew space transportation capabilities with the goal of achieving reliable, cost effective access to low-Earth orbit, and
- create a market environment in which commercial space transportation services are available to Government and private sector customers.

B. This SAA represents Space X and NASA's commitment to conducting the initial development and demonstration phase of the Commercial Crew/Cargo Project. Specifically, the Space X innovative approach to meeting the goals of the project is outlined in Appendix 1.

ARTICLE 1. AUTHORITY

This Agreement is entered into by the National Aeronautics and Space Administration, located at 4th and E Streets, SW, Washington, D.C. (hereinafter referred to as "NASA" or Government), and Space Exploration Technologies Corp., (hereinafter referred to as "SpaceX" or "Participant") with a place of business at 1310 E. Grand Avenue, El Segundo, CA 90245. NASA's authority to enter into this Agreement is in accordance with the authority set forth in Sections 203(c)(5) and 203(c)(6) of the National Aeronautics and Space Act of 1958, as amended and NPR 1050.1G. This agreement will be implemented by NASA at the Lyndon B. Johnson Space Center in Houston, Texas.

ARTICLE 2. PURPOSE

The purpose of this Agreement is to conduct initial development and demonstration phase of the Commercial Orbital Transportation Services (COTS) Project. Under this Agreement, SpaceX will receive milestone payments from NASA to develop and

demonstrate vehicles, systems, and operations needed for SpaceX to perform earth to orbit space flight demonstrations of the following capabilities:

Capability A: External cargo delivery and disposal – delivers cargo (payloads) that operate directly in the space environment to a LEO test bed and provides for its safe disposal.

Capability B: Internal cargo delivery and disposal – delivers cargo (payloads) that operates within a volume maintained at normal atmospheric pressure to a LEO test bed and provides for its safe disposal.

Capability C: Internal cargo delivery and return – delivers cargo (payloads) that operate within a volume maintained at normal atmospheric pressure to a LEO test bed and provides for its safe return to Earth.

Capability D (Option): Crew transportation – delivers crew to a LEO test bed and provides for safe return to Earth.

Collectively, Capability A, B, C, and D shall be referred to herein as the "Demonstrations".

As part of the Demonstrations, NASA will provide the International Space Station (ISS) for use by SpaceX as an orbital destination and active test bed on the condition that SpaceX satisfies applicable ISS visiting vehicle requirements.

The scope of the COTS Project and Demonstrations involves the development and operation of an end-to-end space transportation system of services including ground operations and integration, launch, rendezvous, proximity operations, docking or berthing, orbital operations, reentry, and safe disposal or return.

ARTICLE 3. RESPONSIBILITIES

A. Space X shall:

(1) Conduct the COTS Demonstrations according to the milestones identified in Appendix 2 (Milestones and Success Criteria) and consistent with the visiting vehicle requirements of the CI-IIRD including proving all required deliverables;

(2) Lead a quarterly project status briefing; and

(3) Designate at least one seat on each review board described in Appendix 2 for a NASA representative.

B. NASA shall:

(4) Provide milestone payments to Space X upon successful completion of each milestone, subject to limitations noted below;

(5) Provide the ISS as the orbital destination and active test bed if the ISS visiting vehicle requirements are satisfied. NASA will provide associated technical expertise to facilitate proximity operations, specifically rendezvous and docking, with the International Space Station;

(6) Provide relevant NASA data/information necessary for participant to provide for Visiting Vehicle Integration (VVI) requirements consistent with the CI-IIRD;

(7) Participate in the quarterly project status review; and

(8) Appoint a NASA representative to participate in each review board described in Appendix 2, who shall have concurrence authority on aspects of the space transportation system design, engineering, operations, which affect the ISS or human rating for flight of NASA crew members.

C. Within 30 days of commencement of work by SpaceX under this Agreement, NASA and SpaceX shall jointly develop a Management Interface Plan that articulates the insight and oversight arrangements that will enable management of both SpaceX and NASA to execute their responsibilities under this Agreement and to third parties, including with respect to NASA, to Partner States (as defined below), and with respect to SpaceX, to its shareholders and other constituents.

ARTICLE 4. SCHEDULE AND MILESTONES

The scheduled milestones, acceptance criteria, and payments for each milestone in furtherance of the Demonstrations are identified in Appendix 2 to this Agreement.

ARTICLE 5. FINANCIAL OBLIGATIONS

A. Obligation

(1) The Government's liability to make payments to SpaceX is limited to only those funds obligated annually under this Agreement or by amendment to the Agreement. NASA may obligate funds to the Agreement incrementally.

B. Acceptance and Payment for Milestones

(1) SpaceX shall notify NASA Key Personnel, listed in Article 20, at least 30 calendar days prior to the completion of any milestone to arrange for the NASA Technical Contact or designee to witness the event or accept delivery of documents. With the exception of Milestone 1 (Capability A-C), NASA shall have 30 calendar days to determine whether the milestone event meets its corresponding acceptance criteria as described in Appendix 2 of this Agreement and shall notify SpaceX of NASA's acceptance or non-acceptance. NASA shall have 5 calendar days to determine whether

Milestone 1 (Capability A-C) meets its corresponding acceptance criteria as described in Appendix 2 of this Agreement and shall notify SpaceX of NASA's acceptance or non-acceptance. Any disagreement between NASA and SpaceX about the successful accomplishment of a milestone shall be deemed a Dispute and resolved in accordance with Article 19 of this Agreement.

(2) SpaceX shall submit a written invoice requesting payment from NASA upon notification of acceptance by NASA of each milestone, as identified and described in Appendix 2 of this Agreement. SpaceX shall submit an original and one (1) copy of all invoices to the NASA Administrative Contact listed in this Agreement for review. After receipt and review of the invoice, the NASA Administrative Contact will prepare a written determination of milestone completion and authorize payment. With the exception of Milestone 1 (Capability A-C), payments shall be made by NASA within 30 calendar days of invoice submission. Payment for Milestone 1 shall be made within 15 calendar days. Subject to change only through written Agreement modification, payment shall be made by NASA via electronic funds transfer to the address set forth below:

(3) The following information shall be included on each SpaceX invoice to NASA:
(a). Agreement Number;
(b). Invoice Number;
(c). A description of milestone event;
(d). Terms of Payment;
(e). Payment Office; and
(f). Amount of the fixed contribution claimed

(4) Financial Records and Reports: Except as otherwise provided in this Agreement, SpaceX's relevant financial records associated with this Agreement shall not be subject to examination or audit by NASA.

(5) Comptroller General Access to Records: The Comptroller General, at its discretion and pursuant to applicable regulations and policies, shall have access to and the right to examine records of any Party to the Agreement or any entity that participates in the performance of this Agreement that directly pertain to and involve transactions relating to, the Agreement for a period of three (3) years after the Government makes the final milestone payment under this Agreement. This paragraph only applies to any record that is created or maintained in the ordinary course of business or pursuant to a provision of law. The terms of this paragraph shall be included in any subcontracts or other arrangements valued in excess of $5,000,000.00 that SpaceX has or may enter into related to the execution of the milestone events in this Agreement.

ARTICLE 6. DISSEMINATION OF PUBLIC INFORMATION

A. NASA or SpaceX may, consistent with Federal law and this Agreement, release general information regarding its participation in this Agreement as desired. SpaceX agrees that all press releases resulting from activities conducted under this Agreement shall be provided to NASA for review and approval by the NASA JSC Director of Public Affairs prior to release. Such approval shall not be unreasonably withheld by NASA.

B. SpaceX agrees that the words, "National Aeronautics and Space Administration," or the letters "NASA" will not be used in connection with a SpaceX 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, SpaceX agrees that any proposed use of the NASA name or initials shall be submitted by SpaceX in advance to the NASA Administrative Contact, who will submit the proposed use to the JSC Director of Public Affairs for review and approval. Such approval shall 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. SpaceX agrees that any proposed use of such emblems/devices shall be submitted in advance to the NASA Administrative Contact, who will submit the proposed use the NASA JSC Director of Public Affairs for review and approval in accordance with such regulations.

C. NASA does not endorse or sponsor any commercial product, service, or activity. NASA's participation in this Agreement and/or the supply of goods (i.e., equipment, facilities, technical information) and services under this Agreement does not constitute endorsement by NASA. SpaceX agrees that nothing in this Agreement will be construed to imply that NASA authorizes, supports, endorses, or sponsors any product or service of SpaceX resulting from activities conducted under this Agreement, regardless of the fact that such product or service may employ NASA-developed technology.

ARTICLE 7. NASA FURNISHED INFORMATION AND SERVICES

A. NASA may, at its discretion, make a determination to provide Government Furnished Property or Services and associated technical expertise to facilitate proximity operations, specifically autonomous rendezvous and docking, with the International Space Station. If NASA determines that such property and services are required, the Parties will modify this Agreement to add a description of NASA responsibilities.

B. There is no Government Furnished Property or Services furnished under this Agreement except for those that may be provided in Article 7.A. However, SpaceX has the ability to enter into separate Space Act agreements with NASA Centers to use NASA resources in performance of this Agreement. The terms and conditions of other Space Act agreements will govern the use of NASA resources not being provided under this Agreement. With each of its subcontractors or partners, including NASA Centers, SpaceX will be responsible for ensuring timely, accurate work, and replacing such

subcontractors or partners, where necessary and appropriate and at the discretion of SpaceX, in order to meet milestones.

ARTICLE 8. NONEXCLUSIVITY

This Agreement is not exclusive; accordingly, NASA may enter into similar agreements for the same or similar purpose with other U.S. private or public entities.

ARTICLE 9: PARTICIPANT ANNUAL CERTIFICATIONS

SpaceX shall annually certify the following to the COTS Administrative Contact:

A. Neither SpaceX nor any of its subcontractors nor partners are presently debarred, suspended, proposed for debarment, or otherwise declared ineligible for award of funding by any Federal agency;

B. Neither SpaceX nor any of its subcontractors nor partners have been convicted or had a civil judgment rendered against them within the last three (3) years for fraud in obtaining, attempting to obtain, or performing a Government contract;

C. SpaceX and any of its subcontractors or partners receiving $100,000 or more in NASA funding for work performed under this Agreement must certify that they have not used any appropriated funds for lobbying purposes prohibited by 31 U.S.C. 1352; and

D. SpaceX is an eligible participant as defined in Section 4.2 of the COTS announcement.

ARTICLE 10. LIABILITY AND RISK OF LOSS

A. FAA license(s) or permit(s), including cross-waivers and insurance requirements, for COTS demonstrations conducted by SpaceX under this Agreement will govern the allocation of risks and liability of the U.S. government – including NASA – and SpaceX. To the extent the FAA license(s) or permit(s) do not apply to activities under this Agreement, the following cross-waiver will apply. Under no circumstances will NASA be liable for indemnification of third-party claims.

(1) Purpose: The objective of this Article is to establish a cross-waiver of liability by the Parties and their related entities in the interest of encouraging participation in the exploration, exploitation, and use of outer space through the COTS demonstrations.

(2) For the purposes of this Article:

(a) The term "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 (ISS) (signed January 29, 1998; hereinafter the "Intergovernmental Agreement" or "IGA") has entered into force or become operative (pursuant to Sections 25 and 26, respectively, of the Intergovernmental Agreement), or

any successor agreement. A Partner State includes its Cooperating Agency. It also includes any entity specified in the MOU between NASA and the Government of Japan to assist the Government of Japan's Cooperating Agency in the implementation of that MOU.

(b) The term "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.

(c) The term "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.

(d) The term "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.

(e) The term "Party" means a Party to this Agreement.

(f) The term "payload" means all property to be flown or used on or in a launch vehicle or the ISS.

(g) The term "Protected Space Operations" means all launch vehicle activities, ISS activities, and payload activities on Earth, in outer space, or in transit between Earth and outer space in implementation of the IGA, MOUs concluded pursuant to the IGA, and implementing arrangements. 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, or a payload, 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.

(3) Cross Waiver of Liability

(a) Each Party agrees to a cross-waiver of liability pursuant to which each Party waives all claims against any of the entities or persons listed in subsections (3)(a)(i) through (3)(a)(iv) below based on any 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) another Party;

(ii) a Partner State other than the United States of America;

(iii) a related entity of any entity identified in subparagraphs (3)(a)(i) or (3)(a)(ii) above;

(iv) the employees of any of the entities identified in subsections (3)(a)(i) through (3)(a)(iii) above.

(b) In addition, each Party shall, by contract or otherwise, extend the cross-waiver of liability as set forth in subsection (3)(a) above to its related entities by requiring them to:

(i) waive all claims against the entities or persons identified in subsections (3)(a)(i) through (3)(a)(iv) above; and

(ii) require that their related entities waive all claims against the entities or persons identified in subsections (3)(a)(i) through (3)(a)(iv) above.

(c) For avoidance of doubt, this cross-waiver of liability includes a cross-waiver of liability 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.

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

(i) claims between a Party and its related entities or between its related entities;

(ii) claims made by a natural person, his/her estate, survivors or subrogees (except when a natural person or subrogee is a Party to this 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 natural person;

(iii) claims for damage caused by willful misconduct;

(iv) intellectual property claims;

(v) claims for damage resulting from a failure of a Party to extend the cross-waiver of liability to its related entities, pursuant to subsection (a) and (b), above;

(vi) claims by or against a Party arising out of the other Party's failure to meet its contractual obligations as set forth in the Agreement.

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

(f) This cross-waiver shall not be applicable when the Commercial Space Launch Act cross-waiver (49 U.S.C. 70101 *et seq*) is applicable.

ARTICLE 11. LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS

SpaceX shall not use any funds provided under this Agreement to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan;

the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.

ARTICLE 12. INTELLECTUAL PROPERTY AND DATA RIGHTS - RIGHTS IN DATA

A. General

(1) "Related Entity" as used in this Article, means a contractor, subcontractor, grantee, or other entity having a legal relationship with NASA or SpaceX that is assigned, tasked, or contracted with to perform specified NASA or SpaceX activities under this Agreement.

(2) "Data" as used in this Agreement, means recorded information, regardless of form, the media on which it may be recorded, or the method of recording. The term includes, but is not limited to, data of a scientific or technical nature, software and documentation thereof, and data comprising commercial and financial information.

(3) "Proprietary Data" as used in this Agreement, means Data embodying trade secrets or comprising commercial or financial information that is privileged or confidential.

(4) The Data rights set forth herein are applicable to employees of SpaceX and employees of any Related Entity of SpaceX. SpaceX shall ensure that its employees and employees of any Related Entity that perform SpaceX activities under this Agreement are aware of the obligations under this Article and that all such employees are bound to such obligations.

(5) Data exchanged between NASA and SpaceX under this Agreement will be exchanged without restriction as to its disclosure, use, or duplication, except as otherwise provided in this Article.

(6) No preexisting Proprietary Data will be exchanged between the parties under this Agreement unless specifically authorized in this Article or in writing by the owner of the Proprietary Data.

(7) Certain Data exchanged by the Parties may be deemed by a Party to be privileged, confidential, or otherwise not subject to further dissemination, which Data must be clearly marked with a restrictive notice. In the event that Data exchanged between NASA and SpaceX includes a restrictive notice that NASA or SpaceX deems to be ambiguous or unauthorized, NASA or SpaceX shall inform the other Party of such condition. Notwithstanding such a restrictive notice, as long as such notice provides an indication that a restriction on use or disclosure was intended, the Party receiving such Data will treat the Data pursuant to the requirements of this Article unless otherwise directed in writing by the Party providing such Data.

(8) Notwithstanding any restriction on use, disclosure, or reproduction of Data provided in this clause, the Parties will not be restricted in the use, disclosure, or reproduction of Data provided under this Agreement that: (a) is publicly available at the time of disclosure or thereafter becomes publicly available without breach of this Agreement; (b) is known to, in the possession of, or developed by the receiving party independent of carrying out the receiving party's responsibilities under this Agreement and independent of any disclosure of, or without reference to, Proprietary Data or otherwise protectable Data hereunder; (c) is received from a third party having the right

to disclose such information without restriction; or (d) is required to be produced by the receiving party pursuant to a court order or other legal requirement.

(9) If either NASA or SpaceX believes that any of the events or conditions that remove restriction on the use, disclosure, or reproduction of the Data apply, NASA or SpaceX will promptly notify the other party of such belief prior to acting on such belief, and, in any event, will notify the other party prior to an unrestricted use, disclosure, or reproduction of such Data.

(10) Disclaimer of Liability: Notwithstanding any restriction on use, disclosure, or reproduction of Data provided in this Article, NASA will not be restricted in, nor incur any liability for, the use, disclosure, or reproduction of any Data not identified with a suitable restrictive notice in accordance with paragraphs B and G of this Article or of any Data included in Data which SpaceX has furnished, or is required to furnish to the U.S. Government without restriction on disclosure and use.

(11) When disclosing Data to NASA, SpaceX shall use the same or a similar restrictive notice required by paragraphs B and G of this Article. With respect to Proprietary Data, in addition to identifying with a restrictive notice as required by paragraphs B and G of this Article, SpaceX shall mark each page containing Proprietary Data with the following, or a similar, legend: "PROPRIETARY DATA – use and disclose only in accordance with notice on title or cover page" and provide the following, or a similar, notice on a cover page accompanying the Proprietary Data:

> Proprietary Data Notice
>
> These data herein include <*enter as applicable*: "Background Data" or "Data First Produced by Participant under a Space Act Agreement"> in accordance with the Data Rights provisions under Space Act Agreement <*provide applicable identifying information*> and embody Proprietary Data. In accordance with the Space Act Agreement, NASA shall use reasonable efforts to maintain the data in confidence and limit use, disclosure, and reproduction by NASA and any Related Entity of NASA (under suitable protective conditions) in accordance with restrictions identified in the Space Act Agreement <*may list specific restrictions listed in the Agreement*>.

(12) NASA obtains no rights in pre-existing Data or pre-existing Inventions, except for Inventions made under this Agreement, provided such Data or Inventions are identified with a suitable restrictive notice.

B. Data First Produced by SpaceX under this Agreement

(1) Data first produced by SpaceX in carrying out SpaceX's responsibilities under this Agreement, including but not limited to technical data related to Inventions made under this Agreement, will be furnished to NASA upon request and such Data will be disclosed and used by NASA and any Related Entity of NASA (under suitable protective conditions) during the term of this Agreement exclusively for evaluating SpaceX's performance under this Agreement. If SpaceX considers any such Data to be Proprietary Data, and such Data is identified with a suitable restrictive notice, NASA shall use reasonable efforts to maintain the Data in confidence.

(2) Upon completion by SpaceX and acceptance by NASA of all milestones under this Agreement, NASA shall not assert rights in such Data or use such Data for any purpose except that NASA shall retain the right to: (1) maintain a copy of such Data for archival purposes; and (2) use or disclose such archived Data by or on behalf of NASA exclusively for Government purposes, but only in the event the NASA determines that:

(a) Such action is necessary because SpaceX, its assignee, or other successor has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of Inventions or software related to such Data;

(b) Such action is necessary because SpaceX, its assignee, or other successor, having achieved practical application of Inventions or software related to such Data, has failed to maintain practical application of such Inventions;

(c) Such action is necessary because SpaceX, its assignee, or other successor has discontinued making the benefits of Inventions or software related to such Data available to the public or to the Federal Government;

(d) Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by SpaceX, its assignee, or other successor; or

(e) Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by SpaceX, its assignee, or successor.

(3) In the event NASA terminates this Agreement in accordance with Article 17.B., Termination for Failure to Perform, NASA shall have the right to use or disclose Data first produced by SpaceX in carrying out SpaceX's responsibilities under this Agreement exclusively for Government purposes.

(4) The Parties shall negotiate rights in Data in the event of termination for any reason other than Termination for Failure to Perform (Article 17B).

C. Data First Produced by NASA under this Agreement

(1) Regarding Data first produced by NASA (or any Related Entity of NASA) in carrying out NASA responsibilities under this Agreement that would be Proprietary Data if it had been obtained from SpaceX, such Data will be appropriately marked with a restrictive notice and maintained in confidence for the duration of this Agreement, with the express understanding that during the aforesaid restricted period such Data may be disclosed and used by NASA and any Related Entity of NASA (under suitable protective conditions) only for carrying out NASA responsibilities under this Agreement.

(2) Upon a completion by SpaceX and acceptance by NASA of all milestones under this Agreement, NASA shall not use such Data for any purpose except that NASA shall retain the right to: (1) maintain a copy of such Data for archival purposes; and (2) use or disclose such archived Data by or behalf of the NASA for Government purposes in the event the NASA determines that:

(a) Such action is necessary because SpaceX, its assignee, or other successor has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of Inventions or software related to such Data;

(b) Such action is necessary because SpaceX, its assignee, or other successor, having achieved practical application of Inventions or software related to such Data, has failed to maintain practical application of such Inventions;

(c) Such action is necessary because SpaceX, its assignee, or other successor has discontinued making the benefits of Inventions or software related to such Data available to the public or to the Federal Government;

(d) Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by SpaceX, its assignee, or other successor; or

(e) Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by SpaceX, its assignee, or successor.

(3) In the event NASA terminates this Agreement in accordance with Article 17.B., Termination for Failure to Perform, NASA shall have the right to use or disclose Data first produced by NASA in carrying out NASA's responsibilities under this Agreement for Government purposes.

(4) The Parties shall negotiate rights in Data in the event of termination for any reason other than Termination for Failure to Perform (Article 17B).

D. Publication of Results

(1) Recognizing that section 203 of the National Aeronautics and Space Act of 1958 (42 U.S.C. § 2473), as amended, requires NASA to provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof, and that the dissemination of the results of NASA activities is one of the considerations for this Agreement, NASA will coordinate proposed publication of results relating to the COTS Project or the Demonstrations with SpaceX in a manner that allows SpaceX a reasonable amount of time to review and comment on proposed publications.

(2) Consistent with other obligations in this Article, NASA agrees that it will not publish any results without first receiving written permission from SpaceX.

E. Data Disclosing an Invention

In the event Data exchanged between NASA and SpaceX discloses an Invention for which patent protection is being considered, the furnishing party specifically identifies such Data, and the disclosure and use of such Data is not otherwise limited or restricted herein, the receiving party agrees to withhold such Data from public disclosure for a reasonable time (presumed to be two (2) years) unless mutually agreed otherwise,in order for patent protection to be obtained.

F. Data Subject to Export Control

Technical data, whether or not specifically identified or marked, that is subject to the export laws and regulations of the United States and that is provided to SpaceX under this Agreement will be treated as such, and will not be further provided to any foreign persons or transmitted outside the United States without proper U.S. Government authorization, where required.

G. Background Data

(1) In the event SpaceX furnishes NASA with Data developed at private expense that existed prior to, or was produced outside of, this Agreement, and such Data embody Proprietary Data, and such Data is so identified with a suitable restrictive notice, NASA will use reasonable efforts to maintain the Data in confidence and such Data will be

disclosed and used by NASA and any Related Entity of NASA (under suitable protective conditions) only for evaluating SpaceX's performance under this Agreement. Upon completion of activities under this Agreement, such Data will be disposed of in the manner requested by SpaceX.

(2) At the time of execution of this Agreement, the Parties agree that the following Background Data embodies Proprietary Data that will be provided to NASA: The Parties agree that within 30 days of execution by NASA of this Agreement, Space X may provide NASA with a list of Background Data that embodies Proprietary Data, and NASA shall have 60 days following such delivery to object to such designation. Absent objection by NASA, such date shall constitute Background Data. With respect to Data that NASA objects to being considered Background Data, the Parties will attempt to agree upon the portion of such Data, if any, that constitutes Background Data. All Background Data shall be appropriately marked as Proprietary Data.

H. Handling of Data

(1) In the performance of this Agreement, SpaceX and any Related Entity of SpaceX may have access to, be furnished with, or use the following categories of Data:

(a) Proprietary Data of third parties that the U.S. Government has agreed to handle under protective arrangements; and/or

(b) U.S. Government Data, the use and dissemination of which, the U.S. Government intends to control.

(2) Data provided by the U.S. Government under the Agreement

(a) At the time of execution of this Agreement, the Parties agree that the following Proprietary Data of third parties will be provided to SpaceX with the express understanding that SpaceX will use and protect such Data in accordance with this Article: The Parties agree that within 30 days of execution by NASA of this Agreement, Space X may provide NASA with a list of Proprietary Data of third parties that will be provided to SpaceX, and NASA shall have 60 days following such delivery to consider such designation.

(b) At the time of execution of this Agreement, the Parties agree that the following U.S. Government Data will be provided to SpaceX with the express understanding that SpaceX will use and protect such U.S. Government Data in accordance with this Article: The Parties agree that within 30 days of execution by NASA of this Agreement, Space X may provide NASA with a list of U.S. Government Data that will be provided to SpaceX, and NASA shall have 60 days following such delivery to consider such designation.

(c) At the time of execution of this Agreement, the Parties agree that the following software and related Data will be provided to SpaceX under a separate Software Usage Agreement with the express understanding that SpaceX will use and protect such related Data in accordance with this Article. Unless SpaceX has entered into a license, consistent with 37 C.F.R. Part 404, for software provided under this Agreement, upon completion of activities under this Agreement, such related Data will be disposed of as instructed by NASA: The Parties agree that within 30 days of execution by NASA of this Agreement, Space X may provide NASA with a list of software and related Data to be provided to SpaceX under a separate Software Usage Agreement, and NASA shall have 60 days following such delivery to consider such designation.

(3) With respect to such Data specifically identified in this Agreement or specifically marked with a restrictive notice, SpaceX agrees to:

(a) Use, disclose, or reproduce such Data only to the extent necessary to perform the work required under this Agreement;

(b) Safeguard such Data from unauthorized use and disclosure;

(c) Allow access to such Data only to its employees and any Related Entity that require access for their performance under this Agreement;

(d) Except as otherwise indicated in (3)(c) above, preclude access and disclosure of such Data outside SpaceX's organization;

(e) Notify its employees who may require access to such Data about the obligations under this Article, obtain written affirmation from all such employees that they have received such notification, administer a monitoring process to ensure that such employees comply with such obligations, and ensure that any Related Entity performs the same functions with respect to its employees; and

(f) Return or dispose of such Data, as NASA may direct, when the Data is no longer needed for performance under this Agreement.

I. Oral and visual information

If information that SpaceX considers to be Proprietary Data is disclosed orally or visually to NASA, NASA will have no duty to limit or restrict, and will not incur any liability for, any disclosure or use of such information unless: (1) SpaceX orally informs NASA before or at the time of disclosure that such information is considered to be Proprietary Data; and (2) SpaceX reduces such information to tangible, recorded form that is identified and marked with a suitable restrictive notice as required by paragraphs B and G above and furnishes the resulting Data to NASA within 10 days after such oral or visual disclosure.

ARTICLE 13. INTELLECTUAL PROPERTY AND DATA RIGHTS - INVENTION AND PATENT RIGHTS

NASA obtains no rights in pre-existing Data or pre-existing Inventions, except for Inventions made under this Agreement, provided such Data or Inventions are identified with a suitable restrictive notice.

A. Definitions

(1) "Administrator," as used in this Article, means the Administrator of the National Aeronautics and Space Administration (NASA) or duly authorized representative.

(2) "Patent Representative" as used in this Article means the NASA Johnson Space Center Patent Counsel. Correspondence with the Patent Representative under this clause will be sent to the address below:

Patent Counsel
NASA Johnson Space Center
Mail Code AL
2101 NASA Parkway
Houston, TX 77058

(3) "Invention," as used in this Agreement, means any innovation or discovery that is or may be patentable or otherwise protectable under title 35 of the U.S.C.

(4) "Made," as used in this Agreement in relation to any Invention, means the conception or first actual reduction to practice of such Invention.

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

(6) "Related Entity" as used in this Article, means a contractor, subcontractor, grantee, or other entity having a legal relationship with NASA or SpaceX that is assigned, tasked, or contracted with to perform specified NASA or SpaceX activities under this Agreement.

B. Allocation of principal rights

(1) Presumption of title

(a) Any Invention made under this Agreement shall be presumed to have been made in the manner specified in paragraph (1) or (2) of section 305(a) (42 U.S.C. § 2457(a)) of the National Aeronautics and Space Act of 1958 (hereinafter called "the Act"), and the above presumption shall be conclusive unless at the time of reporting such Invention SpaceX submits to the Patent Representative a written statement, containing supporting details, demonstrating that the Invention was not made in the manner specified in paragraph (1) or (2) of section 305(a) of the Act.

(b) Regardless of whether title to such an Invention would otherwise be subject to an advance waiver or is the subject of a petition for waiver as described in paragraph B.(3) and paragraph I of this Article, SpaceX may nevertheless file the statement described in paragraph B.(1)(a) of this Article. The Administrator (or his designee) will review the information furnished by SpaceX in any such statement and any other available information relating to the circumstances surrounding the making of the Invention and will notify SpaceX whether the Administrator has determined that the Invention was made in the manner specified in paragraph (1) or (2) of section 305(a) of the Act.

(2) Property rights in Inventions. Each Invention made under this Agreement for which the presumption of paragraph B.(1)(a) of this clause is conclusive or for which there has been a determination that it was made in the manner specified in paragraph (1) or (2) of section 305(a) of the Act shall be the exclusive property of the United States as represented by the Administrator of NASA unless the Administrator waives all or any part of the rights of the United States to SpaceX's Invention, as provided in paragraph B.(3) of this clause.

(3) Waiver of rights.

(a) The NASA Patent Waiver Regulations, 14 C.F.R. Part 1245, Subpart 1, have adopted the Presidential Memorandum on Government Patent Policy of February 18, 1983, as a guide in acting on petitions (requests) for waiver of rights to any Invention or class of Inventions made or that may be made in the manner specified in paragraph (1) or (2) of Section 305(a) of the Act.

(b) NASA has determined that to stimulate and support the capability of a United States commercial provider to provide space and orbital transportation services to the public and the Federal Government, the interest of the United States would be served by waiving to SpaceX, in accordance with provisions of 14 C.F.R. Part 1245, Subpart 1, rights to Inventions made by SpaceX in the performance of work under this Agreement. Therefore, upon petition submitted by SpaceX, as provided in 14 C.F.R. Part 1245, Subpart 1, either prior to execution of the Agreement or within 30 days after execution of the Agreement, for advance waiver of rights to any or all of the Inventions that may be made under this Agreement, NASA agrees to waive such rights to SpaceX. If such a petition is not submitted, SpaceX may petition for waiver of rights to an identified Invention within eight months of first disclosure of Invention in accordance with paragraph E.(2) of this clause or within such longer period as may be authorized in accordance with 14 CFR 1245.105. Further procedures are provided in paragraph I of this Article.

C. Minimum rights reserved by the Government

(1) With respect to each SpaceX Invention made under this Agreement for which a waiver of rights is applicable in accordance with 14 C.F.R. Part 1245, Subpart 1, the Government reserves:

(a) An irrevocable, royalty-free license for the practice of such Invention throughout the world by or on behalf of the United States or any foreign government in accordance with any treaty or agreement with the United States; and

(b) Such other March-in rights as given in Paragraph H below.

(2) NASA will not exercise the government purpose license reserved in paragraph C.(1)(a) during the term of this Agreement.

(3) Upon a completion and acceptance of all milestones under this Agreement, NASA will refrain from exercising the government purpose license reserved in paragraph C.(1)(a) until December 31, 2020.

(4) Nothing contained in this paragraph shall be considered to grant to the Government any rights with respect to any Invention other than an Invention made under this Agreement.

D. Minimum rights to SpaceX

(1) SpaceX is hereby granted a revocable, nonexclusive, royalty-free license in each patent application filed in any country on an Invention made by SpaceX under this Agreement and any resulting patent in which the Government acquires title, unless SpaceX fails to disclose such Invention within the times specified in paragraph E.(2) of this clause. SpaceX's license extends to its domestic subsidiaries and affiliates, if any, within the corporate structure of which SpaceX is a party and includes the right to grant sublicenses of the same scope to the extent SpaceX was legally obligated to do so at the time the Agreement was awarded. The license is transferable only with the approval of the Administrator except when transferred to the successor of that part of SpaceX's business to which the Invention pertains.

(2) SpaceX's domestic license may be revoked or modified by the Administrator to the extent necessary to achieve expeditious practical application of such Invention pursuant to an application for an exclusive license submitted in accordance with 37

C.F.R. Part 404, Licensing of Government Owned Inventions. This license will not be revoked in that field of use or the geographical areas in which SpaceX has achieved practical application and continues to make the benefits of the Invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at the discretion of the Administrator to the extent SpaceX, its licensees, or its domestic subsidiaries or affiliates have failed to achieve practical application in that foreign country.

(3) Before revocation or modification of the license, SpaceX will be provided a written notice of the Administrator's intention to revoke or modify the license, and SpaceX will be allowed 30 days (or such other time as may be authorized by the Administrator for good cause shown by SpaceX) after the notice to show cause why the license should not be revoked or modified. SpaceX has the right to appeal, in accordance with 14 C.F.R. 1245.112, any decision concerning the revocation or modification of its license.

E. Invention identification, disclosures, and reports

(1) SpaceX shall establish and maintain active and effective procedures to assure that Inventions made under this Agreement are promptly identified and disclosed to SpaceX personnel responsible for the administration of this clause within six months of conception and/or first actual reduction to practice, whichever occurs first in the performance of work under this Agreement. These procedures shall include the maintenance of laboratory notebooks or equivalent records and other records as are reasonably necessary to document the conception and/or the first actual reduction to practice of such Inventions, and records that show that the procedures for identifying and disclosing such Inventions are followed. Upon request, SpaceX shall furnish the Patent Representative a description of such procedures for evaluation and for determination as to their effectiveness.

(2) SpaceX will disclose each such Invention to the Patent Representative within two months after the inventor discloses it in writing to SpaceX personnel responsible for the administration of this clause or, if earlier, within six months after SpaceX becomes aware that such an Invention has been made, but in any event before any on sale, public use, or publication of such Invention known to SpaceX. SpaceX shall use the NASA electronic New Technology Reporting system (eNTRe), accessible at http://invention.nasa.gov, to disclose Inventions to the Patent Representative. The Invention disclosure shall identify this Agreement and shall be sufficiently complete in technical detail to convey a clear understanding, to the extent known at the time of the disclosure, of the nature, purpose, operation, and physical, chemical, biological, or electrical characteristics of the Invention. The disclosure shall also identify any publication, on sale, or public use of any such Invention and whether a manuscript describing such Invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to NASA, SpaceX shall promptly notify NASA of the acceptance of any manuscript describing such an Invention for publication or of any on sale or public use planned by SpaceX for such Invention.

(3) SpaceX shall furnish the Patent Representative the following:

(a) Interim reports every 12 months (or such longer period as may be specified by the Patent Representative) from the date of the Agreement, listing Inventions made under

this Agreement during that period, and certifying that all such Inventions have been disclosed (or that there are no such Inventions) and that the procedures required by paragraph E.(2) of this clause have been followed.

(b) A final report, within three months after completion of the work, listing all Inventions made under this Agreement or certifying that there were no such Inventions, and listing all subcontracts or other agreements with a Related Entity containing a patent and Invention rights clause (as required under paragraph G of this clause) or certifying that there were no such subcontracts or other agreements.

(c) Interim and final reports shall be submitted electronically at the eNTRe Web-site: http://invention.nasa.gov.

(4) SpaceX agrees, upon written request of the Patent Representative, to furnish additional technical and other information available to SpaceX as is necessary for the preparation of a patent application on an Invention made under this Agreement in which the Government retains title and for the prosecution of the patent application, and to execute all papers necessary to file patent applications on such Inventions and to establish the Government's rights in the Inventions, where applicable.

(5) Protection of reported Inventions. When Inventions made under this Agreement are reported and disclosed to NASA in accordance with the provisions of this Article, NASA agrees to withhold such reports or disclosures from public access for a reasonable time (presumed to be two (2) years unless otherwise mutually agreed) in order to facilitate the allocation and establishment of the Invention and patent rights under these provisions.

F. Examination of records relating to Inventions

(1) The Patent Representative or designee shall have the right to examine any books (including laboratory notebooks), records, and documents of SpaceX relating to the conception or first actual reduction to practice of inventions in the same field of technology as the work under this Agreement to determine whether:

(a) Any such Inventions were made in performance of this Agreement;

(b) SpaceX has established and maintained the procedures required by paragraph E.(1) of this clause; and

(c) SpaceX and its inventors have complied with the procedures.

(2) If the Patent Representative learns of an unreported SpaceX Invention that the Patent Representative believes may have been made under this Agreement, SpaceX may be required to disclose the Invention to NASA for a determination of ownership rights.

(3) Any examination of records under this paragraph will be subject to appropriate conditions to protect the confidentiality of the information involved.

G. Subcontracts or Other Agreements

(1)(a) Unless otherwise authorized or directed by the Patent Representative, SpaceX shall include this *Invention and Patent Rights* Article (suitably modified to identify the parties) in any subcontract or other agreement with a Related Entity hereunder (regardless of tier) for the performance of experimental, developmental, or research work.

(b) In the *Invention and Patent Rights* Article included in any such subcontract or other agreement, the following (suitably modified to identify the parties) shall be substituted for paragraph B(3)(b):

As provided in 14 C.F.R. Part 1245, Subpart 1, XYZ may petition, either prior to execution of the Agreement or within 30 days after execution of the Agreement, for advance waiver of rights to any or all of the Inventions that may be made under this Agreement. If such a petition is not submitted, or if after submission it is denied, XYZ may petition for waiver of rights to an identified Invention within eight months of first disclosure of Invention in accordance with paragraph E.(2) of this Article or within such longer period as may be authorized in accordance with 14 CFR 1245.105. Further procedures are provided in paragraph H of this Article.

(c) In the case of subcontracts or other agreements at any tier, NASA, the Related Entity, and SpaceX agree that the mutual obligations of the parties created by this Article constitute privity of contract between the Related Entity and NASA with respect to those matters covered by this Article.

(2) In the event of a refusal by a prospective Related Entity to accept such a clause, SpaceX:

(a) Shall promptly submit a written notice to the Patent Representative setting forth the prospective Related Entity's reasons for such refusal and other pertinent information that may expedite disposition of the matter; and

(b) Shall not proceed with such subcontract or other agreement without the written authorization of the Patent Representative.

(3) SpaceX shall promptly notify the Patent Representative in writing upon the award of any subcontract or other agreement with a Related Entity (at any tier) containing an Invention and patent rights clause by identifying the Related Entity, the applicable Invention and patent rights clause, the work to be performed under the subcontract or other agreement, and the dates of award and estimated completion. Upon request of the Patent Representative, SpaceX shall furnish a copy of such subcontract or other agreement, and, no more frequently than annually, a listing of the subcontracts or other agreements that have been awarded.

(4) In recognition of SpaceX's substantial contribution of funds, facilities and/or equipment to the work performed under this Agreement, SpaceX is authorized, subject to the rights of NASA set forth elsewhere in this Article, to:

(a) Acquire by negotiation and mutual agreement rights to an Invention made under this Agreement by a Related Entity as SpaceX may deem necessary to obtaining and maintaining of private support; and

(b) Request, in the event of inability to reach agreement pursuant to paragraph G(4)(a) of this Article, that NASA request that such rights for SpaceX be included as an additional reservation in a waiver granted pursuant to 14 CFR Part 1245, Subpart 1. Any such requests to NASA should be prepared in consideration of the following guidance and submitted to the Patent Representative: Notwithstanding paragraph B.(3)(b) of this Article, the Related Entity should be advised that unless it requests a waiver of title pursuant to the NASA Patent Waiver Regulations (14 C.F.R. Part 1245, Subpart 1), NASA will acquire title to Inventions made under this Agreement. If a waiver is not requested or granted, SpaceX may request a license from NASA consistent with the requirements of 37 CFR Part 404. A Related Entity requesting a waiver must follow the procedures set forth in paragraph I of this Article.

H. March-in rights

(1) SpaceX agrees that, with respect to any Invention made under this Agreement in which it has acquired title, NASA has the right in accordance with the procedures in 37 CFR 401.6 and any supplemental regulations of the agency to require SpaceX, or an assignee or exclusive licensee of such an Invention, to grant a nonexclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants, upon terms that are reasonable under the circumstances. If SpaceX, its assignee, or exclusive licensee refuses such a request, NASA has the right to unilaterally grant such a license if the Federal agency determines that:

(a) Such action is necessary because SpaceX, assignee, or exclusive licensee has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of such Invention in such field of use;

(b) Such action is necessary because SpaceX, assignee, or exclusive licensee, having achieved practical application of such Invention, has failed to maintain practical application of such Invention in such field of use;

(c) Such action is necessary because SpaceX, assignee, or exclusive licensee has discontinued making the benefits of such Invention available to the public or to the Federal Government;

(d) Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by SpaceX, assignee, or exclusive licensee; or

(e) Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by SpaceX, assignee, or exclusive licensee.

I. Requests for Waiver of Rights

(1) In accordance with the NASA Patent Waiver Regulations, 14 C.F.R. Part 1245, Subpart 1, waiver of rights to any or all Inventions made or that may be made under this Agreement may be requested at different time periods. Advance waiver of rights to any or all such Inventions may be requested prior to the execution of the Agreement, or within 30 days after execution thereof. In addition, waiver of rights to an identified Invention made and reported under this Agreement may be requested, even though a request for an advance waiver was not previously requested or, if previously requested, was not granted.

(2) Each request for waiver of rights shall be by petition to the Administrator and shall include an identification of the petitioner; place of business and address; if petitioner is represented by counsel, the name, address, and telephone number of the counsel; the signature of the petitioner or authorized representative; and the date of signature. No specific forms need be used, but the request should contain a positive statement that waiver of rights is being requested under the NASA Patent Waiver Regulations; a clear indication of whether the request is for an advance waiver or for a waiver of rights for an individual identified Invention; whether foreign rights are also requested and, if so, for which countries, and a citation of the specific section(s) of the regulations under which such rights are requested; and the name, address, and telephone number of the party with whom to communicate when the request is acted upon.

(3) All petitions for waiver, whether advanced or individual petitions, will be submitted to the Patent Representative designated in this Article.

(4) A Petition submitted in advance of this Agreement will be forwarded by the Patent Representative, consistent with subsection B.(3)(b) of this Article, to the Inventions and Contributions Board. The Board will consider the petition and where the Board makes the findings to support the waiver, the Board will recommend to the Administrator that waiver be granted, and will notify the petitioner and the Patent Representative of the Administrator's determination. The Patent Representative will be informed by the Board whenever there is insufficient time or information to permit a decision to be made on an advance waiver without unduly delaying the execution of the Agreement. In the event a request for an advanced waiver is not granted or is not decided upon before execution of the Agreement, the petitioner will be so notified by the Patent Representative. All other petitions will be processed by the Patent Representative and forwarded to the Board. The Board shall notify the petitioner of its action and if waiver is granted, the conditions, reservations, and obligations thereof will be included in the Instrument of Waiver. Whenever the Board notifies a petitioner of a recommendation adverse to, or different from, the waiver requested, the petitioner may request reconsideration under procedures set forth in the NASA Patent Waiver Regulations.

ARTICLE 14. OPTION TO EXERCISE CAPABILITY D

Appendix 2, Milestones and Success Criteria, includes optional milestones regarding Space X's demonstration of a crew transportation capability. The "Capability D Crew Transportation Option" milestones are included only as a priced option to this Agreement and create no obligation for either party to perform unless the option is exercised by NASA. NASA shall have the exclusive right to exercise this option by providing to Space X written notification of such an intention from the Associate Administrator of Exploration Systems or his designee.

ARTICLE 15. DISCLAIMER OF WARRANTY

Goods (i.e., equipment, facilities, technical information, data, prototypes) and services, if provided by NASA under this Agreement, are provided "as is" and no warranty related to availability, title, or suitability for any particular use, nor any implied warranty of merchantability or fitness for a particular purpose, is provided under this Agreement. NASA makes no express or implied warranty as to any intellectual property, generated information, or product made or developed under this Agreement, or that the goods, services, materials, products, processes, information, or data to be furnished hereunder will accomplish intended results or are safe for any purpose including the intended purpose.

SpaceX has not made, nor does it make, any representation or warranty, whether written or oral, whether express or implied, including, but not limited to, intellectual property, generated information, any warranty of design, operation, quality, workmanship, suitability, result, merchantability, or fitness for a particular purpose with respect to the COTS Project, Demonstrations, spacecraft, launch vehicles, launch services, or any associated equipment and services. Any implied warranties, including warranties of merchantability and fitness for a particular purpose, are hereby expressly disclaimed. SpaceX makes no express or implied warranty that the goods, services, materials,

products, processes, information, or data to be furnished hereunder will accomplish intended results or are safe for any purpose including the intended purpose.

ARTICLE 16. TERM OF AGREEMENT

This Agreement becomes effective upon the date of the last signature below and shall remain in effect until the completion of all obligations of both parties hereto, or through December 31, 2011, whichever comes first.

ARTICLE 17. TERMINATION

A. Termination by Mutual Consent

This Agreement may be terminated at any time upon mutual written consent of both Parties.

B. Termination for Failure to Perform

(1) At its discretion, NASA may terminate this Agreement 30 days after issuance of a written notification that SpaceX has failed to perform under this Agreement by failing to meet a scheduled milestone, as identified and described in Appendix 2. Before making such a notification, NASA must consult with SpaceX to ascertain the cause of the failure and determine whether additional efforts are in the best interest of the Parties. Upon such a notification and determination, NASA will take all rights identified in Articles 12 and 13 of this agreement.

(2) SpaceX will not be entitled to any additional payments from the Government due to a termination for failure to meet a milestone. NASA and SpaceX will negotiate in good faith any other outstanding issues between the Parties. Failure of the Parties to agree will be resolved pursuant to Article 19, Dispute Resolution. SpaceX shall retain without liability or obligation of repayment all NASA payments made and received as of the date of termination.

C. Unilateral Termination by NASA

(1) NASA may unilaterally terminate this Agreement upon written notice in the following circumstances: (a) upon a declaration of war by the Congress of the United States; or (b) upon a declaration of a national emergency by the President of the United States; or (c) upon a NASA determination, in writing, that NASA is required to terminate for reasons beyond its control. For purposes of this Article, reasons beyond NASA's control include, but are not limited to, acts of God or of the public enemy, acts of the U.S. Government other than NASA, in either its sovereign or contractual capacity (to include failure of Congress to appropriate sufficient funding), fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, or unusually severe weather.

(2) Upon receipt of written notification that the Government is unilaterally terminating this Agreement, SpaceX shall immediately stop work under this Agreement and shall immediately cause any and all of its partners and suppliers to cease work, except to the extent that SpaceX wishes to pursue these Demonstrations, or similar projects, exclusively using its own funding. Upon such a termination, NASA and SpaceX agree to negotiate in good faith a final settlement payment to be made by NASA. However, in no instance shall NASA's liability for termination exceed the total amount

due under the next milestone of this Agreement and is subject to the provisions of Article 5. SpaceX shall retain without liability or obligation of repayment all NASA payments made and received as of the date of termination. Failure of the parties to agree will be resolved pursuant to Article 19, Dispute Resolution.

D. Limitation on Damages

In the event of any termination by NASA, neither NASA nor SpaceX shall be liable for any loss of profits, revenue, or any indirect or consequential damages incurred by the other Party, its contractors, subcontractors, or customers as a result of any termination of this Agreement. A Party's liability for any damages under this Agreement is limited solely to direct damages, incurred by the other Party, as a result of any termination of this Agreement subject to mitigation of such damages by the complaining party. However, in no instance shall NASA's liability for termination exceed the total amount due under the next milestone under this Agreement.

E. Rights in Property

SpaceX will have title to property acquired or developed by SpaceX and its contractors/partners with government funding, in whole or in part to conduct the work specified under this Agreement. In the event of termination of this Agreement for Failure to Perform, NASA may purchase such property as provided in Article 26 below. Upon Termination for Failure to Perform, NASA may immediately exercise all rights identified in Articles 12 and 13.

ARTICLE 18. CONTINUING OBLIGATIONS

The obligations of the parties set forth in the provisions of Articles 10 (Liability and Risk of Loss) and 12-13 (Intellectual Property and Data Rights) of this Agreement concerning liability and intellectual property rights shall continue to apply after the expiration or termination of this Agreement.

ARTICLE 19. DISPUTE RESOLUTION

All disputes concerning questions of fact or law arising under this Agreement shall be referred by the claimant in writing to the SpaceX Administrative Contact and the NASA Administrative Contact, who shall seek to resolve such disputes by mutual agreement. If they are unable to resolve the dispute, then the dispute will be referred to the JSC Commercial Crew Cargo Project Manager and the CEO of SpaceX for joint resolution. If the parties are still unable to resolve the dispute, the Associate Administrator for Exploration Systems Mission Directorate, or the Deputy of the Directorate, will seek to resolve the dispute and, if necessary, issue a written decision that shall be a final Agency decision for all purposes, including judicial review.

Pending resolution of any disputes pursuant to this Article, the Parties agree that performance of all obligations shall continue to be pursued diligently in accordance with the direction of the JSC Commercial Crew Cargo Project Manager.

The Parties agree that this Disputes Resolution procedure shall be the exclusive procedure followed by the Parties in resolving any dispute arising under, or based on, an express or implied provision of this Agreement, including an alleged breach.

ARTICLE 20. PRINCIPAL POINTS OF CONTACT

The following personnel are designated as the Administrative and Technical Contacts between the parties in the performance of this Agreement.

NASA Administrative Contact

NASA Administrative Contact
Johnson Space Center
2101 NASA Parkway
Houston, TX 77058
Phone: 281-
Fax:
E-mail:

SpaceX Administrative Contact

Vice President, Business Development
1310 E. Grand Avenue
El Segundo, CA 90245
(310) 414-6555
fax: (310) 414-6552

NASA Technical Contact

NASA Technical Contact
Johnson Space Center
Mail Stop: QA
2101 NASA Parkway
Houston, TX 77058
Phone: 281-
Fax:
E-mail:

SpaceX Technical Contact

Senior Mission Manager
1310 E. Grand Avenue
El Segundo, CA 90245
(310) 414-6555
Fax: (310) 414-6552

ARTICLE 21. MODIFICATION/AMENDMENTS

All modifications and amendments to this Agreement shall be by mutual agreement of the Parties and shall be executed, in writing, and signed by the signatories to this Agreement, or their respective successor or designee.

ARTICLE 22. ASSIGNMENT OF RIGHTS

Neither this Agreement nor any interest arising under it will be assigned by either Party without the express written consent of the other Party.

ARTICLE 23. ANTI-DEFICIENCY ACT

All activities under or pursuant to this Agreement are subject to the availability of appropriated funds, and no provision shall be interpreted to require obligation or provision of funds in violation of the Anti-Deficiency Act, 31 U.S.C. 1341.

ARTICLE 24. APPLICABLE LAW AND SEVERABILITY

U.S. Federal law governs this Agreement for all purposes, including, but not limited to, determining the validity of this Agreement, the meaning of its provisions, and the rights, obligations and remedies of the Parties.

If any portion of this Agreement is held invalid by a court of competent jurisdiction, the Parties agree that such invalidity shall not affect the validity of the remaining portions of this Agreement, unless applying such remaining portions would frustrate the purpose of this Agreement.

ARTICLE 25. EXPORT LICENSES

SpaceX will be responsible for:

A. Compliance with all U.S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120 through 130, and the Export Administration Regulations (EAR), 15 CFR Parts 730 through 799, in the performance of this Agreement. In the absence of available license exemptions/exceptions, SpaceX will be responsible for obtaining the appropriate licenses or other approvals, if required, for exports of hardware, technical data, and software, or for the provision of technical assistance.

B. Obtaining export licenses, if required, before utilizing foreign persons in the performance of this Agreement, including instances where COTS efforts are to be performed on-site at NASA Centers, where the foreign person will have access to export-controlled technical data or software.

C. All regulatory record keeping requirements associated with the use of licenses and license exemptions/exceptions.

D. Ensuring that the provisions of this Article apply to its subcontractors.

In the event that either party intends to utilize a foreign person (as defined in the International Traffic in Arms Regulations and the Export Administration Regulations) in the performance of this Agreement, such party shall be responsible for obtaining the required export licenses in advance of the foreign person's participation.

ARTICLE 26. TITLE AND RIGHTS IN REAL AND PERSONAL PROPERTY

SpaceX will have title to property acquired or developed under this Agreement, including developed or acquired by SpaceX for the COTS Project and Demonstrations. In the

event of Termination for Failure to Perform under Article 17B, NASA will have the right to purchase any such property. The Parties will negotiate in good faith purchase prices for specific items of property. The negotiated prices will be based on SpaceX's actual costs for purchase or development of the specific item(s), or fair market value, whichever is less. This price will then be discounted by a percentage that reflects the ratio of government funding provided under the Agreement versus the amount of SpaceX funding used to develop the specific item(s) of property. However, NASA shall have no rights in property acquired or purchased by SpaceX that does not directly derive from NASA funding under this Agreement.

ARTICLE 27. SIGNATURE BLOCK

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

BY: _____
Scott Horowitz,
Associate Administrator for Exploration Systems

DATE: 8/18/2006

SPACE EXPLORATION TECHNOLOGIES CORP.

BY: _____
Elon Musk,
Chief Executive Officer

1310 E. Grand Avenue
El Segundo, CA 90245

DATE: 6-26-06

SPACEX

Appendix 1 – Executive Summary

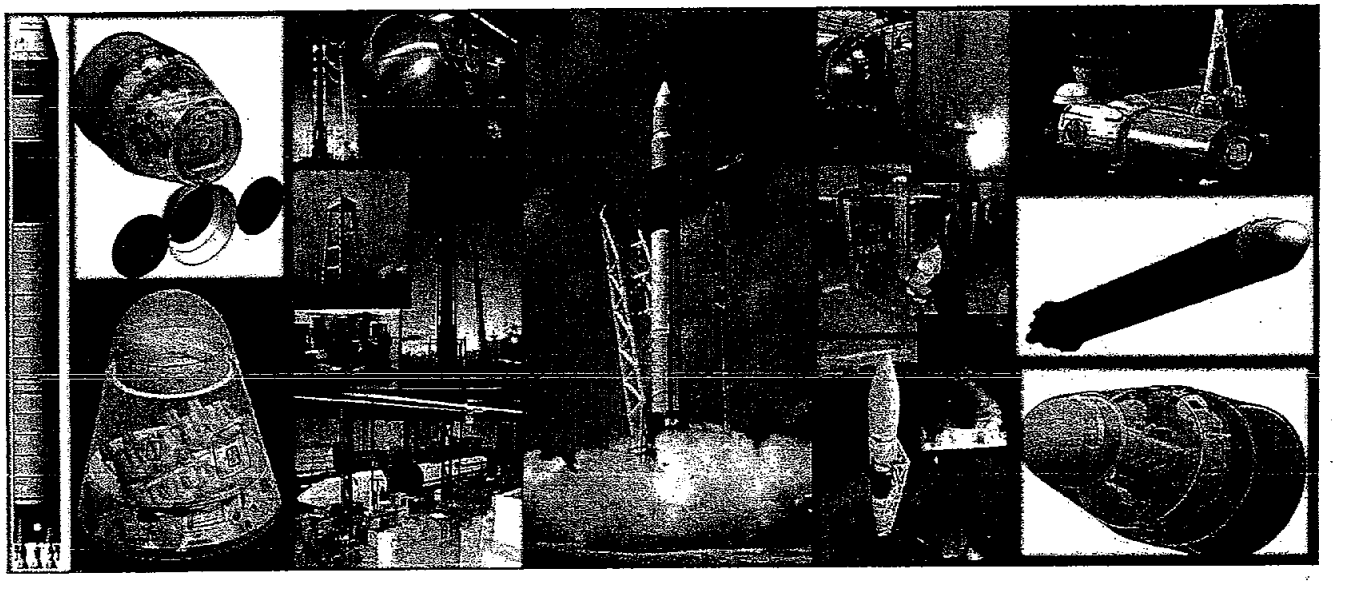
Response to NASA
Announcement Number COTS-01-05

Commercial Orbital Transportation Services Demonstrations

Section I
Executive Summary

Multiple Capabilities:
A; B; C; D

Space Exploration Technologies Corp.
1310 East Grand Avenue
El Segundo, CA 90245



Executive Summary

Company Information and Business Plan Summary

Breakthrough innovation most often comes from new entrants and rarely from the incumbents, who have a vested interest in the status quo. Most new entrants, however, lack the business experience, technical talent and funding necessary for complex system development. By contrast, established industry players generally have the requisite experience, personnel, and funds for such development, but are encumbered by their overwhelming size, a deep-seated unwillingness to change and burdensome overhead costs accumulated over decades.

Critically, the successful bidder for the COTS demonstration program must combine both sets of attributes – that is, the COTS winner should possess the rare capability to co-mingle innovative technical approaches and novel business methods with the necessary business expertise, technical personnel and funding. We believe that SpaceX is uniquely positioned in this regard and, moreover, has demonstrated a track record of execution unparalleled in contemporary industry.

Starting from three employees in mid-2002, SpaceX has grown rapidly to approximately 180 full time personnel, including deep expertise in propulsion, structures, avionics, safety, quality assurance, mission management and systems integration. Development funding has been and will be provided as necessary by its financial backers, however prepayments from launch customers now constitute a significant funding source for SpaceX.

Perhaps the most unbiased endorsement of the SpaceX product comes from customers who have committed their funds and their payloads to our care. We have seven firm contracts for launch of our Falcon 1 light launch vehicle, three of which are for foreign countries with no vested interest in promoting a US launch vehicle company (Malaysia, Sweden and Canada), plus a $100 million dollar IDIQ from the US Air Force. The US government has also purchased the 2007 maiden launch of Falcon 9, our medium/heavy launch vehicle, and we have two commercial contracts for launch of Falcon 9 in 2008, bringing our total number of launches on contract to ten. In addition, as we received our ISO 9001 certification in April of this year, SpaceX expects to place both the Falcon 1 and 9 on the NASA launch catalogue.

In terms of tangible hardware, over the course of three and a half years, SpaceX has developed in-house, qualified for flight and delivered to the launch pad the following:

- Turbo-pump fed LOX/RP main engine
- High mass fraction first stage designed for reusability
- Pressure fed LOX/RP upper stage engine with exceptional performance (97% C* eff.)
- Multi-restart capable upper stage
- Redundant stage and fairing separation systems
- A complete avionics & guidance system

- A flight termination system that is approved at two federal ranges, including the first ever non-explosive thrust termination system for an orbital launch vehicle

In addition, SpaceX has developed complete launch sites and control centers at Vandenberg and Kwajalein, a world-class engine and structural test facility in Texas and has received all requisite permissions from government regulators to launch, including final environmental and safety approvals.

The singular purpose of SpaceX is to improve the reliability and cost efficiency of access to space. To achieve these goals, SpaceX has taken the approach of first focusing on satellite delivery, while working towards human carriage over the longer term. SpaceX's first product, the Falcon 1, is a small launch vehicle intended only for satellites. The Falcon 5 and 9, however, are intended for both large satellites and ultimately human transportation to orbit. Critically, SpaceX set an initial price for the Falcon 1 in 2002 and has held that price steady through 2006, effectively reducing the price over time when inflation is taken into account.

Along with booster development, SpaceX planned to create a manned spacecraft to fly on the Falcon 9. To that end, SpaceX has partially developed a prototype crew capsule and life support system, which is currently on the floor of our El Segundo factory. By itself, this technology would have developed slowly over several years as ongoing cash flow allowed and, lacking NASA as a customer, would not have conformed to NASA needs. The COTS procurement, however, provides the mechanism to accelerate the timing of this development and ensure that it is tailored to the requirements of NASA for both cargo and crew transport to the ISS.

COTS Development and Demonstration Plan

The SpaceX proposal for executing on capabilities A-C is divided into three demonstration flights, culminating in an actual berthing with the ISS. Payments are similarly structured to be in line with the three demonstrations. Should NASA choose to pursue capability D, SpaceX proposes an additional three demonstrations, culminating in transport of astronauts to and from the ISS. The SpaceX internal name for the cargo/crew capsule is Dragon.

Capability A-C

- Demo 1, Q2 2008 – Core Functionality Flight. The first flight of Dragon is intended to demonstrate core functionality, such as on orbit maneuvering, structural integrity, systems functions and entry/descent/landing. Note, the spacecraft will be highly instrumented, with multi-megabit telemetry and video on all missions.
- Demo 2, Q1 2009 – Virtual Autonomous Rendezvous & Berthing. This test will validate autonomous rendezvous and berthing procedures, including testing of autonomous & manual aborts, but with a virtual version of the ISS to alleviate concerns over a malfunction.
- Demo 3, Q3 2009 – ISS Berthing and Downmass Return. This test is to complete qualification of the Dragon/F9 LV for cargo delivery and return. The goal will be to rendezvous and berth with the ISS, then return safely back to Earth, carrying ISS experiments and/or waste.

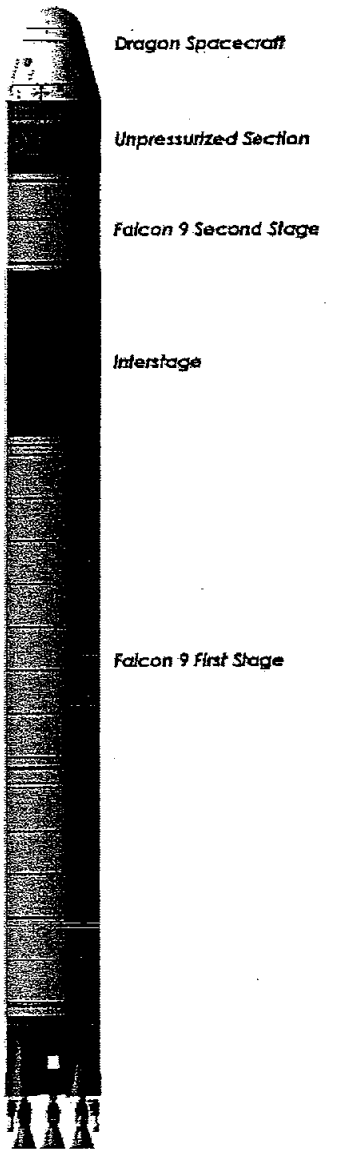
Assuming a 3 month contracting period post demonstration phase, SpaceX could execute its first servicing mission in December, 2010.

Capability D (Schedule determined by contract authority to proceed and NASA funding, but could be completed by 2010)

- Demo 1 – Unmanned high altitude abort to demonstrate the crew escape system.
- Demo 2 – Crewed mission with virtual autonomous rendezvous and manual override.
- Demo 3 – Crewed visit ISS Visit and safe return to Earth.

Total funding required from NASA for demonstration of capabilities A-C is $278M with an estimated recurring complete cost per flight of SpaceX will contribute towards the development and demonstration of Capability A-C. Each mission would deliver 1,400 kg of pressurized and 1,700 kg of unpressurized cargo, as well as 1,400 kg of pressurized downmass and 1,700 kg of unpressurized trash disposal. This provides NASA with a cost per kilogram to ISS comparable to that of the Russians, but with an almost entirely domestic technology base. The sole foreign partner is MDA of Canada, who will assist with the berthing function.

To complete demonstration of Capability D would require an additional $308M with an estimated recurring complete cost per flight of The SpaceX contribution for Capability D is Each mission would be able to deliver as many as seven astronauts to ISS if minimal cargo is carried, providing a significant saving in cost per person relative to foreign options.



Both Falcon 9 and Dragon are designed for reusability, but the costs as proposed assume no reusability economics. Until a given launch system has flown several times and all costs are understood, it is very risky to make reusability cost assumptions. However, SpaceX intends to work hard to make the reusability economics positive and has started that learning curve with the Falcon 1 first stage. If such economics work out, there is the potential for substantial savings in cost per flight.

Technical Approach

SpaceX is the company best positioned to seamlessly and cost-efficiently integrate a crew/cargo capability with the Falcon 9 booster, taking maximum advantage of the Falcon 9 upper stage's capabilities to simplify the COTS architecture. Though other COTS bidders may propose use of the Falcon 9 booster, the SpaceX proposal is the only one that leverages the inherent capabilities of the second stage as an initial "station approach" vehicle. This simplifies the architecture and allows optimization of the capsule mass. The proposed crew capability will also benefit from parallel development with the Falcon 9, so that the rocket can be man-rated during the course of its development.

The Falcon 9 is intended to be a fully reusable, 2 stage launch vehicle powered by LOX/RP engines. The first stage generates 765,000lbf of

thrust (sea-level) using nine Merlin 1C engines and the second stage generates 96,000lbf (vacuum) using a single Merlin 1C engine. Both stages use gimbaled engines for guidance. Like some vehicles in the Apollo program, Falcon 9 offers engine-out capability (for the first stage).

The basic configuration for each launch is illustrated to the right. At the top of the stack is the Dragon spacecraft, a pressurized capsule used for transport of either pressurized cargo or a crew of 3 to 7. Below this is an unpressurized sleeve (the 'trunk') which serves to support the pressurized capsule during ascent and also contains a truss structure designed to hold unpressurized cargo. Eight cargo launches per year will be required to meet the COTS cargo mass and volume annual requirements.

Crewed launches are in addition to this, nominally 2 or 3 per year. A launch with a crew of 3 can also include up to 1,000 kg of cargo (in addition to the 250 kg pressurized ISS cargo mandated in the COTS SRM Summary), which can be divided between pressurized and unpressurized as needed. A launch with a crew of 7 will have essentially no additional cargo capacity.

Besides containing all the functions required to support crew or pressurized cargo, Dragon also contains much of which might be found in a typical "service module", including reaction control thrusters, GN&C, command & data handling, telemetry & communications, ISS proximity operations sensors, power & thermal control, entry, descent, landing, locator & emergency equipment and environmental control and life support sub-systems.

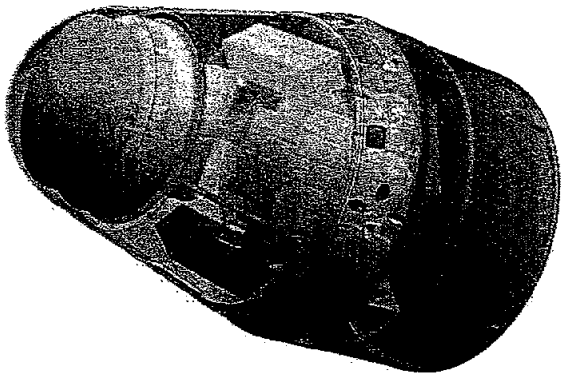
The Dragon spacecraft design is structurally identical for both the cargo and crew configurations, the only difference being the internal outfitting and some subsystems. For cargo launches the inside of the capsule is outfitted with a modular cargo rack system designed to accommodate pressurized cargo in standard sizes and form factors based on the Space Shuttle Mid-deck Locker Equivalent specifications. For crewed launches, the interior is outfitted with crew couches, controls with manual override capability and upgraded life support. Keeping the cargo and crewed versions of Dragon similar minimizes the design effort.

The primary pressure vessel will be made of welded aluminum and the deployable nose cone of lightweight carbon composite materials. Deployables have been kept to a minimum for reliability. The only external deployment mechanism is the hinge and latch mechanism for the nose cone, with solar arrays hidden inside. If the closing and latching procedure does not complete nominally, the entire assembly can be severed at the hinges by redundant pyro-cutters, since the nose is not required for safe reentry. Surrounding the entire spacecraft, except the heat shield, is a 2" micrometeoroid shield. Note, while on orbit, the heat shield is protected from micrometeoroids by the trunk section.

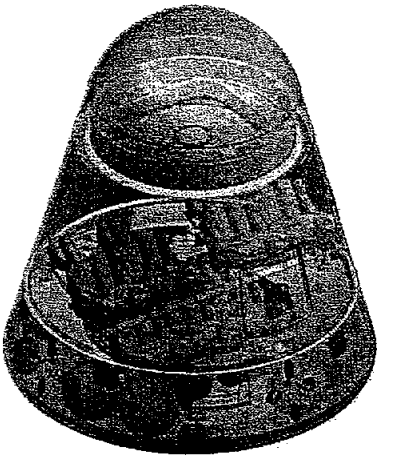
The primary Dragon propulsion system consists of four independent modules containing four 50 lbf NTO/MMH thrusters and four 2 lbf cold gas (He) thrusters, which achieves thruster out redundancy. In addition, there is an auxiliary set of two NTO/MMH thrusters for two fault tolerance near the ISS. Total NTO/MMH mass is 2000 lbs, sufficient for on orbit maneuvering, de-orbit and re-entry control. SpaceX possesses deep internal expertise in developing space qualified NTO/MMH thrusters. Within the final 50 to 100m of the ISS, propulsion reverts to the cold gas thrusters for maximum reliability and fine-grained translation and attitude control.

The spacecraft is designed to have a canonical blunt body, lifting re-entry with a radially offset center-of-mass, which induces a trim angle of attack. The sidewall angle of 15° is a compromise between internal volume, TPS mass and L/D. The L/D of approximately 0.3 allows a 2° re-entry corridor and keeps nominal deceleration for the crew safely below 5g. Initial CFD analyses indicate an acceptable center-of-pressure and rear-wall heating under re-entry conditions.

Dragon is designed to be fully autonomous in both cargo and crewed configurations, with manual over-rides for crew control of critical functions. A CBM berthing interface is mounted under the nose cone which hinges open once in orbit. Although berthing is preferred, the nose-cone will accommodate a docking adapter (either LIDS, APAS or something else) if required. For "last mile" navigation, Dragon will use an MDA system employing the ISS S-Band Comms/Rendezvous System and LIDAR to navigate to the berthing box.

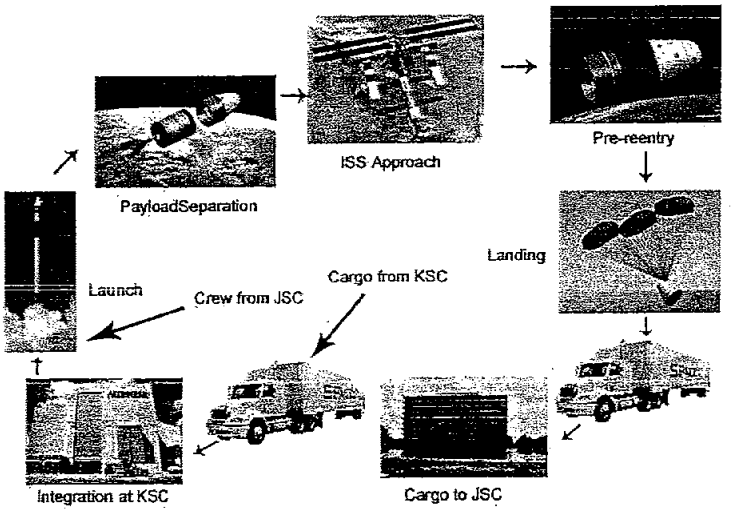


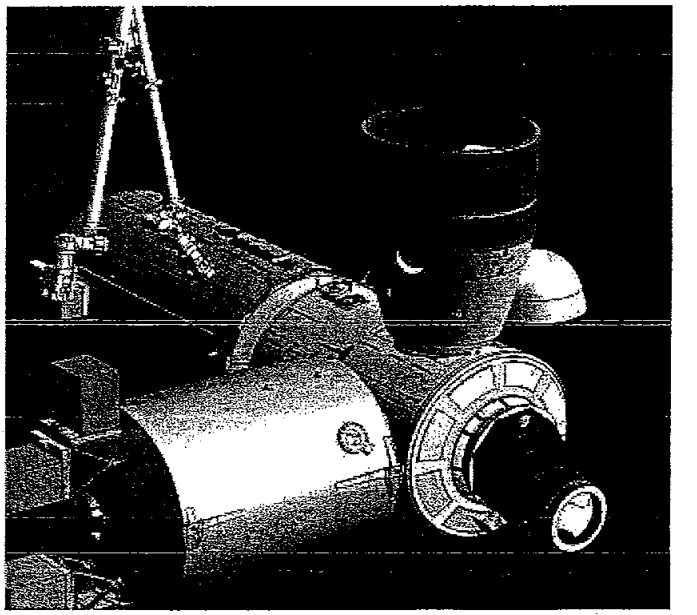
Cargo Version Solid Model



Crewed Version Solid Model

After berthing with the ISS and delivering cargo or crew, Dragon is re-loaded with crew or down-cargo. Once reloaded, Dragon is un-berthed, departs the ISS and performs a de-orbit burn, jettisons the unpressurized section, and performs a guided re-entry and splash-down under parachute. SpaceX will perform ocean recovery, delivering crew and/or cargo to NASA.





Kwajalein is the world's largest lagoon, with an area of 840 square kilometers. This allows for an easy nominal recovery of the Dragon capsule. Waters are calm, warm, hurricane free and have no lethal predators. Positioned correctly, the current SpaceX ocean catamaran can reach any point in the lagoon within 45 minutes and the nominal landing point within 15 minutes. The Falcon stage recovery vessel, stationed a few hundred miles out to sea, will be standing by in the event of an off nominal recovery.

Eligibility

Pursuant to Section 4.2 of the COTS Announcement, SpaceX is eligible to submit a proposal for the COTS demonstrations. Specifically, SpaceX is a U.S. company, incorporated in the state of Delaware and with its principal place of business in El Segundo, California. The company is more than fifty percent owned by Mr. Elon Musk.

SpaceX is compliant with each of the laws, regulations and policies set forth in Section 4.3 of the COTS Announcement.

APPENDIX 2: SpaceX Milestones and Success Criteria

Capabilities A-C

Milestone 1: Project Management Plan Review Subsequent to Space Act Agreement execution and initiation of the COTS program, SpaceX shall host a kickoff meeting to describe the plan for program implementation, which includes management planning for Design, Development, Testing, & Evaluation (DDT&E), integrated schedule, financing, supplier engagement, risks and anticipated mitigations. SpaceX shall provide a briefing of the program implementation plan, along with a hard copy of the presentation materials, and responses to any questions that the NASA Team might have concerning SpaceX's plan. Acceptance within 5 days and payment within 15 days Success Criteria: Successful completion of the project management plan review as described above.	Amount: $23,133,333 Date: Sept. 2006
Milestone 2: Demo 1 System Requirements Review SpaceX shall conduct a Demonstration 1 System Requirements Review (SRR) in accordance with the SRR definition in Appendix 3. Success Criteria: Successful completion of the SRR.	Amount $5,000,000 Date: Nov. 2006
Milestone 3: Demo 1 Preliminary Design Review (PDR) SpaceX shall conduct a Preliminary Design Review (PDR) in accordance with the PDR definition in Appendix 3 Success Criteria: Successful completion of the PDR.	Amount: $18,133,333 Date: Jan. 2007
Milestone 4: Financing Round 1 Success Criteria: All necessary documentation is completed and the funds are deposited as evidenced by bank statement.	Amount: $10,000,000 Date: March 2007

Milestone 5: Demo 2 System Requirements Review SpaceX shall conduct a Demonstration 2 System Requirements Review (SRR) in accordance with the SRR definition in Appendix 3. Success Criteria: Successful completion of the SRR.	Amount $31,133,333 Date: March 2007
Milestone 6: Demo 1 System Critical Design Review SpaceX shall conduct a System Critical Design Review (CDR) in accordance with accordance with the CDR definition in Appendix 3. SpaceX shall also provide review of the FAA Licensing Package. Success Criteria: Successful completion of the System CDR and draft of the FAA Licensing Package.	Amount $8,133,333 Date: Aug. 2007
Milestone 7: Demo 3 System Requirements Review SpaceX shall conduct a Demonstration 3 System Requirements Review in accordance with the SRR definition in Appendix 3.. Success Criteria: Successful completion of the SRR.	Amount $22,333,333 Date: October, 2007
Milestone 8: Demo 2 Preliminary Design Review SpaceX shall conduct a Preliminary Design Review (PDR) in accordance with the PDR definition in Appendix 3. Success Criteria: Successful completion of the PDR..	Amount $21,133,333 Date: December, 2007

Milestone 9: Demo 1 Readiness Review SpaceX shall conduct a Demo 1 Readiness Review (DRR) in accordance with the DRR definition in Appendix 3. Success Criteria: Successful completion of the Demo 1 DRR.	Amount $5,633,333 Date: February 2008
Milestone 10: Financing Round 2 Success Criteria: All necessary documentation is completed and the funds are deposited as evidenced by bank statement.	Amount: $10,000,000 Date: March 2008
Milestone 11: Demo 3 Preliminary Design Review SpaceX shall conduct a Preliminary Design Review (PDR) in accordance with the PDR definition in accordance with the PDR definition in Appendix 3. Success Criteria: Successful completion of the PDR.	Amount: $22,333,333 Date: April 2008
Milestone 12: Demo 2 System Critical Design Review SpaceX shall conduct a System Critical Design Review (CDR) in accordance with the CDR definition in Appendix 3.. Success Criteria: Successful completion of the CDR and draft of the FAA Licensing Package.	Amount $21,133,333 Date: June 2008

Milestone 13: Demo 1 Mission SpaceX shall perform a Launch Readiness Review (LRR), Demonstration 1 mission, and complete a post demonstration report. Success Criteria: Complete the launch, meet the goals of the demonstration and complete the post demonstration report with any anomalies resolved.	Amount $5,633,333 Date: Sept. 2008
Milestone 14: Demo 2 Readiness Review SpaceX shall conduct a Demo 2 Demonstration Readiness Review (DRR) in accordance with the DRR definition in accordance with the definition in Appendix 3. Success Criteria: Successful completion of the Demo 2 DRR.	Amount $16,133,333 Date: December 2008
Milestone 15: Demo 3 System Critical Design Review SpaceX shall conduct a Demo 3 System Critical Design Review (CDR in accordance with the CDR definition in Appendix 3. Success Criteria: Successful completion of the CDR and draft of the FAA Licensing Package.	Amount $22,333,333 Date: Jan. 2009
Milestone 16: Financing Round 3 Success Criteria: All necessary documentation is completed and the funds are deposited as evidenced by bank statement.	Amount: $10,000,000 Date: March 2009

Milestone 17: Demo 2 Mission SpaceX shall perform a Launch Readiness Review, Demonstration 2 mission, and complete a post demonstration report. Success Criteria: Complete the launch, meet the goals of the demonstration and complete the post demonstration report with any anomalies resolved.	Amount $6,133,333 Date: June, 2009
Milestone 18: Demo 3 Readiness Review SpaceX shall conduct a Demo 3 Demonstration Readiness Review (DRR) in accordance with the DRR definition in Appendix 3. Success Criteria: Successful completion of the Demo 3 DRR.	Amount $12,333,333 Date: July, 2009
Milestone 19: Demo 3 Mission SpaceX shall perform a Launch Readiness Review, Demonstration 3 mission, and complete a post demonstration report. Success Criteria: Complete the launch, meet the goals of the demonstration and complete the post demonstration report with any anomalies resolved.	Amount $7,333,333 Date: Sept. 2009

Capability D Crew Transportation

Milestone D1: Project Management Plan Review & Crew Demo 1 System Requirements Review Subsequent to Space Act Agreement execution and initiation of the COTS program, SpaceX shall host a kickoff meeting to describe the plan for program implementation, which includes management planning for Design, Development, Testing, & Evaluation (DDT&E), integrated schedule, financing, supplier engagement, risks and anticipated mitigations. SpaceX shall provide a briefing of the program implementation plan, along with a hard copy of the presentation materials, and responses to any questions that the NASA Team might have concerning SpaceX's plan. SpaceX shall conduct a Crew Demonstration 1 System Requirements Review (SRR) in accordance with the SRR definition in Appendix 3. Success Criteria: Successful completion of the Project Management plan review. Successful completion of the SRR.	Amount: $27,420,000 Date: Dec. 2009
Milestone D2: Financing Round D1 Success Criteria: All necessary documentation is completed and the funds are deposited as evidenced by bank statement.	Amount: $10,000,000 Date: March 2010
Milestone D3: Crew Demo 1 System Preliminary Design Review SpaceX shall conduct a Preliminary Design Review (PDR) in accordance with the PDR definition in Appendix 3. Success Criteria: Successful completion of the PDR.	Amount: $22,420,000 Date: April 2010

Milestone D4: Crew Demo 2 System Requirements Review SpaceX shall conduct a Crew Demonstration 2 System Requirements Review (SRR) in accordance with the SRR definition in Appendix 3. Success Criteria: Successful completion of the SRR.	Amount: $25,420,000 Date: June 2010
Milestone D5: Crew Demo 1 Critical Design Review SpaceX shall conduct a System Critical Design Review (CDR) in accordance with the CDR definition in Appendix 3. Success Criteria: Successful completion of the CDR and draft of the FAA Licensing Package.	Amount: $20,420,000 Date: August 2010
Milestone D6: Crew Demo 2 System Preliminary Design Review SpaceX shall conduct a Preliminary Design Review (PDR) in accordance with the PDR definition in Appendix 3. Success Criteria: Successful completion of the PDR.	Amount: $20,420,000 Date: Oct. 2010
Milestone D7: Crew Demo 1 Demonstration Readiness Review SpaceX shall conduct a Demo 1 Readiness Review (DRR) in accordance with the DRR definition in Appendix 3. Success Criteria: Successful completion of the DRR.	Amount $20,420,000 Date: Dec. 2010

Milestone D8: Crew Demo 3 System Requirements Review SpaceX shall conduct a Crew Demonstration 3 System Requirements Review (SRR) in accordance with the SRR definition Appendix 3. Success Criteria: Successful completion of the Crew Demo 3 SRR.	Amount: $25,420,000 Date: Feb. 2011
Milestone D9: Financing Round 2D Success Criteria: All necessary documentation is completed and the funds are deposited as evidenced by bank statement.	Amount: $10,000,000 Date: March 2011
Milestone D10: Crew Demo 2 Critical Design Review SpaceX shall conduct a System Critical Design Review (CDR) in accordance with the CDR definition in Appendix 3. Success Criteria: Successful completion of the CDR and draft of the FAA Licensing Package.	Amount: $18,420,000 Date: March 2011
Milestone D11: Crew Demo 3 System Preliminary Design Review The SpaceX shall conduct a Preliminary Design Review (PDR) in accordance with the PDR definition in Appendix 3. Success Criteria: Successful completion of the PDR.	Amount: $20,420,000 Date: May 2011

Milestone D12: Crew Demo 1 Mission SpaceX shall perform a Launch Readiness Review, launch, and complete a post demonstration report. Success Criteria: Complete the launch, meet the goals of the demonstration and complete the post demonstration report with any anomalies resolved.	Amount $15,420,000 Date: June 2011
Milestone D13: Crew Demo 2 Demonstration Readiness Review SpaceX shall conduct a Demo 2 Demonstration Readiness Review (DRR) in accordance with the DRR definition in Appendix 3. Success Criteria: Successful completion of the DRR.	Amount $18,420,000 Date: July 2011
Milestone D14: Crew Demo 3 Critical Design Review SpaceX shall conduct a System Critical Design Review (CDR) in accordance with the CDR definition in Appendix 3. Success Criteria: Successful completion of the CDR and draft of the FAA Licensing Package.	Amount: $18,420,000 Date: Sept.. 2011
Milestone D15: Crew Demo 2 Mission SpaceX shall perform a Launch Readiness Review, launch and complete a post demonstration report Success Criteria: Complete the launch, meet the goals of the demonstration, and complete the post demonstration report with any anomalies resolved.	Amount $8,420,000 Date: December 2011

Milestone D16: Crew Demo 3 Demonstration Readiness Review SpaceX shall conduct a Demo 2 Demonstration Readiness Review (DRR) in accordance with the DRR definition in Appendix 3. Success Criteria: Successful completion of the DRR.	Amount $18,420,000 Date: Jan. 2012
Milestone D17: Crew Demo 3 Mission SpaceX shall perform a Launch Readiness Review, launch and complete a post demonstration report Success Criteria: Complete the launch, meet the goals of the demonstration, and complete the post demonstration report with any anomalies resolved.	Amount $8,420,000 Date: April 2012

Appendix 3 Success Criteria for COTS Milestone Reviews

G.2 System Requirements Review (SRR)

a. The SRR examines the functional and performance requirements defined for the system and the preliminary program or project plan and ensures that the requirements and the selected concept will satisfy the mission.

b. [Reserved]

c. **Entrance Criteria.** Prior to the execution of the SRR the activities and products identified in Table G-2 should be completed and documentation provided to all participants seven (7) calendar days prior to the review.

d. **Success Criteria.** The review board was able to conclude that the success criteria in Table G-2 was accomplished to complete the objectives of the SRR.

Table G-2 – SRR Entrance and Success Criteria

System Requirements Review and/or Mission Definition Review	
Entrance Criteria	**Success Criteria**
1. A preliminary SRR agenda, success criteria, and charge to the board have been agreed to by the technical team, project manager, and review chair prior to the SRR. 2. The following technical products for hardware and software system elements are available to the cognizant participants prior to the review: a. System Architecture. b. System requirements document. c. System software functionality description. d. Updated concept of operations. e. Preliminary system requirements allocation to the next lower level system. f. List of major trades. g. Updated risk assessment and mitigations. h. Updated schedule data. i. Preliminary human rating plan. j. Preliminary software development plan. k. Preliminary system safety and mission assurance plan. l. Configuration management plan. m. Initial document tree. n. Preliminary system safety & mission assurance plan. o. Preliminary verification and validation approach. p. Preliminary hazard analysis outline.	1. The resulting overall concept is reasonable, feasible, complete, responsive to the mission requirements, and is consistent with system requirements and available resources (cost, schedule, mass power, etc.). 2. The project utilizes a sound process for the allocation and control of requirements throughout all levels, and a plan has been defined to complete the definition activity within schedule constraints. 3. Requirements definition is complete with respect to top level mission and science requirements, and interfaces with external entities and between major internal elements have been defined. 4. Requirements allocation and flow down of key driving requirements have been defined down to subsystems. 5. System and subsystem design approaches and operational concepts exist and are consistent with the requirements set. 6. The requirements, design approaches, and conceptual design will fulfill the mission needs within the estimated costs. 7. Preliminary approaches have been determined for how requirements will be verified and validated down to the

	subsystem level 8. Major risks have been identified, and viable mitigation strategies have been defined.

G.4 Preliminary Design Review (PDR)

a. The Preliminary Design Review (PDR) demonstrates that the preliminary design meets all system requirements with acceptable risk and within the cost and schedule constraints and establishes the basis for proceeding with detailed design. It will show that the correct design option has been selected, interfaces have been identified, and verification methods have been described.

b. PDR occurs near the completion of the preliminary design phase.

c. **Entrance Criteria.** Prior to the execution of the PDR, the activities and products identified in Table G-4 should be completed and documentation provided to all participants seven (7) calendar days prior to the review. Also, precursor reviews should be completed.

d. **Success Criteria.** The review board was able to conclude that the success criteria in Table G-4 was accomplished to complete the objectives of the PDR.

Table G-4 – PDR Entrance and Success Criteria

Preliminary Design Review	
Entrance Criteria	**Success Criteria**
1. A preliminary PDR agenda, success criteria, and charge to the board have been agreed to by the technical team, project manager, and review chair prior to the PDR. 2. PDR technical products listed below for both hardware and software system elements have been made available to the cognizant participants prior to the review: a. Updated baselined documentation, as required. b. Preliminary subsystem design specifications for each configuration item (hardware and software), with supporting tradeoff analyses and data, as required. The preliminary software design specification needs to include a completed definition of the software architecture and a preliminary database design description as applicable. c. Updated risk assessment and mitigation. d. Updated schedule data. e. Preliminary logistics plan. f. Applicable technical plans (e.g., technical performance measurement plan, contamination control plan, parts management plan, environments control plan, EMI/EMC control plan, quality assurance plan, etc.). g. Applicable standards. h. Preliminary safety analyses and plans. i. Engineering drawing tree. j. Interface control documents.	1. Agreement exists for the top-level requirements, including mission success criteria, Technical Performance Measures (TPMs), and any sponsor-imposed constraints, and that these are finalized, stated clearly, and are consistent with the preliminary design. 2. The flow down of verifiable requirements is complete and proper or, if not, an adequate plan exists for timely resolution of open items. Requirements are traceable to mission goals and objectives. 3. The preliminary design is expected to meet the requirements at an acceptable level of risk. 4. Definition of the technical interfaces is consistent with the overall technical maturity and proves an acceptable level of risk. 5. Adequate technical interfaces are consistent with the overall technical maturity and provide an acceptable level of risk. 6. Adequate technical margins exist with respect to technical performances measures (TPMs).

k. Verification/validation plan. l. Plans to respond to regulatory requirements (e.g., Environmental Impact Statement), as required. m. System-level hazard analysis. n. Preliminary limited life items list (LLIL).	7. The project risks are understood, and plans and a process and resources exist to effectively manage them. 8. Safety and mission assurance (i.e., safety, reliability, maintainability, quality, and EEE parts) have been adequately addressed in preliminary designs and any applicable preliminary S&MA products (i.e., hazard analysis and failure modes and effects analysis) have been approved. 9. The operational concept is technically sound, that it includes (where appropriate) human factors that apply, and that requirements for its execution flow down.

G.5 Critical Design Review (CDR)

a. The purpose of the CDR is to demonstrate that the maturity of the design is appropriate to support proceeding with full scale fabrication, assembly, integration, and test, and that the technical effort is on track to complete the flight and ground system development and mission operations in order to meet mission performance requirements within the identified cost and schedule constraints.

b. CDR occurs near the completion of the final design phase and generally before entering the fabrication, assembly, and qualification phase.

c. **Entrance Criteria.** Prior to the execution of the CDR, the activities and products identified in Table G-5 should be completed and documentation provided to all participants seven (7) days prior to the review. Also, precursor reviews should be completed.

d. **Success Criteria.** The review board was able to conclude that the success criteria in Table G-5 was accomplished to complete the objectives of the CDR.

Table G-5 – CDR Entrance and Success Criteria

Critical Design Review	
Entrance Criteria	**Success Criteria**
1. Successful completion of the PDR and responses has been made to all PDR open issues, or a timely closure plan exists for those remaining open. 2. A preliminary CDR agenda, success criteria, and charge to the board have been agreed to by the technical team, project manager and review chair prior to the CDR. 3. CDR technical products listed below for both hardware and software system elements have been made available to the cognizant participants seven (7) days prior to the review: a. Updated baselined documents, as required. b. Product build-to specifications for each hardware and software configuration item, along with supporting trade-off analyses and data. c. Fabrication, assembly, integration, and top-level test plans and procedures. d. Technical data (e.g., Integrated Schematics, Spares Provisioning List, engineering analyses, specifications, etc.). e. Interface Control Documents (e.g. Command and Telemetry List, instrumentation, electrical, mechanical, fluids & gas interfaces, user interfaces) f. Preliminary Test Requirements document (e.g. Operational Limits and Constraints, acceptance criteria) g. Verification & Validation Plan (including requirements and specification). h. Launch Site Operations Plan, including Checkout and Activation Plan. i. Updated risk assessment and mitigation. j. Updated schedule data. k. Updated logistics documentation. l. Software Design Review m. Updated LLIL. n. Subsystem-level and preliminary operations hazards analyses. o. Systems and subsystem certification plans and requirements (as needed). p. System hazard analysis with associated verifications.	1. The detailed design is expected to meet the requirements with adequate margins at an acceptable level of risk. 2. Interface control documents are appropriately matured to proceed with fabrication, assembly, integration and test, and plans are in place to manage any open items. 3. High confidence exists in the product baseline, and adequate documentation exists and/or will exist in a timely manner to allow proceeding with fabrication, assembly, integration, and test. 4. The product verification and product validation requirements and plans are complete. 5. The testing approach is comprehensive, and the planning for system assembly, integration, test, and launch site and mission operations is sufficient to progress into the next phase. 6. Adequate technical and programmatic margins and resources exist to complete the development within budget, schedule, and risk constraints. 7. Risks to mission success are understood, and plans and resources exist to effectively manage them. 8. Safety and mission assurance (i.e., safety, reliability, maintainability, quality, and EEE parts) have been adequately addressed in system and operational designs and any applicable S&MA products (i.e., hazard analysis and failure modes and effects analysis) have been approved.

G.6 Demonstration Readiness Review (DRR)

a. A DRR ensures that the test article (hardware/software), test facility, support personnel, and test procedures are ready for testing and data acquisition, reduction, and control.

b. A DRR is held prior to commencement of launch site operations and prior to shipment of Dragon to the launch site.

c. Entrance Criteria. Prior to the execution of a DRR, the activities and products identified in Table G-6 should be completed and documentation provided to all participants prior to the review.

d. Success Criteria. The review board was able to conclude that the success criteria in Table G-6 was accomplished to complete the objectives of a DRR.

Table G-6 – DRR Entrance and Success Criteria

Demo Readiness Review	
Entrance Criteria	**Success Criteria**
1. The objective of the demonstration flight have been clearly defined and documented and that all of the mission plans and procedures support those objectives. 2. Configuration of system under test has been defined and agreed to. All interfaces have been placed under configuration management or have been defined in accordance with an agreed to plan, and a version description document has been made available to DRR participants prior to the review. 3. All applicable functional, unit level, subsystem, system, and qualification testing has been conducted successfully. 4. All DRR specific materials such as test plans, test cases, and procedures have been available to all participants prior to conducting the review. 5. All known system discrepancies have been identified and dispositioned in accordance with an agreed upon plan. 6. All previous design review success criteria and key issues have been satisfied in accordance with an agreed upon plan. 7. All required launch resources (people (including a designated launch director) facilities, test articles, test instrumentation) have been identified and are available to support required tests. 8. Roles and responsibilities of all launch participants are defined and agreed to. 9. Test contingency planning has been accomplished, and all personnel have been trained.	1. Adequate mission plans and procedures are completed and approved. 2. Adequate identification and coordination of required mission resources is completed 3. Previous component, subsystem, system test results form a satisfactory basis for proceeding into planned mission. 4. Risk level is identified and accepted by program/competency leadership as required. 5. Plan to capture any lessons learned from the mission 6. The objectives of the mission have been successfully validated. 7. The mission design has been reviewed and analyzed as consistent with mission objectives. 8. Launch operations personnel have received appropriate training in vehicle processing, flight operation, safety and contingency procedures. 9. Facilities (launch site) and range documentation approved as required prior to flight. 10. Mission goals defined, documented and agreed upon.