AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		9

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicble)
0002	09/17/10	82-1039-10	

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8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)

CODE FACILITY CODE

(X)

9A. AMENDMENT OF SOLICIATION NO.
N00173-10-R-SE07

9B. DATED (SEE ITEM 11)
08/11/10

10A. MODIFICATION OF CONTRACT/ORDER NO.

10B. DATED (SEE ITEM 11)

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

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

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

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

12. ACCOUNTING AND APPROPIRATION DATA (If required)

13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [x] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

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

SEE ATTACHED

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

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA (Signature of Contracting Officer)	16C. DATE SIGNED

The purposed of this Amendment is to revise attachment (2) and answer questions received from potential offerors.

1. Attachment (2) is hereby deleted in its entirety and replaced with the attached Revision 1 to Attachment (2)

2. QUESTION: Do Sections 3.2.7.3 and 3.2.7.4 of the SOW require that offerors price the costs of the off-site office space and off-site storage facility, as well as the infrastructure and equipment to support activities in these off-site facilities, into their business proposal as other non-labor related costs?

ANSWER: The Contractor (Offeror) shall provide the personnel and supplies, to include facilities as described in the Statement of Work. How an offorer includes the cost of these facilities is based on the Contractor's financial accounting system. It is anticipated that a qualified Contractor's facilities cost are included in their indirect costs. The sections 3.2.7.3 and 3.2.7.4 do not require the contractor to provide infrastructure and equipment.

3. QUESTION: In the event a successful, non-incumbent offeror assesses and concludes (during contract phase-in) that an incumbent employee serving in a key position is uniquely qualified to optimally assure continuity of services in that position, do the provisions of contract clause H-2 deny the successful offeror the ability to substitute the incumbent employee for their proposed employee, assuming the incumbent employee accepts the offer of employment from the successful offeror?

ANSWER: The key personnel you propose would fall under the terms and condition of the clause at H-2, specifically paragraphs (b) and (c).

4. QUESTION: Please specify contract start date.

ANSWER: Estimated start date would be sometime before the end of the calendar year.

5. QUESTION: Will there be tasking for all labor categories on Day 1 or will tasking be phased in? If phased in, please provide the schedule for phasing in each labor category.

ANSWER: For the purpose of the response, offeror should assume tasking for all labor categories start on Day 1.

6. Is there anywhere in the SOW that addresses a transition plan?

ANSWER: *See Section L-14(b)(3).*

7. QUESTION: What are the actual staffing levels? The levels of experience do not match the levels called out in the job descriptions.

ANSWER: See revised Attachment (2) Personnel Qualifications.

8. QUESTION: The RFP titles with level of effort on pages 13 and 14 do not match the titles of the job summaries provided in attachment number 2 (Personnel Qualifications). In addition, the personnel qualifications all have a range of experience level anywhere from 0-15 while the titles on page 13 and 14 have a defined level of experience required. Are you going to provide job summaries to match the exact titles/labor categories specified on the total level of effort pages 13 and 14?

ANSWER: See revised Attachment (2) Personnel Qualifications

9. QUESTION: Attachment J2: Personnel Qualifications does not provide qualifications for the following labor categories referenced in Section H:

- Trade Studies Mechanical Engineer
- Requirements Definition Aerospace Engineer
- Launch Operations Support Mechanical Engineer
- Structure Design & Drafting Mechanical Engineer
- Thermal Control System Mechanical Engineer
- Thermal Control System Mechanical Technician
- Reaction Control System Mechanical Technician
- Vibration Testing Mechanical Technician
- Thermal Vacuum Testing Mechanical Technician
- Transportation Support Facilities Technician
- On-site Facility Technician
- Concept Development System Engineer
- Design Fab &Test Mechanical Engineer
- Investigation & Development Aerospace Engineer

Please provide the missing qualification descriptions.

ANSWER: See revised Attachment (2) Personnel Qualifications

10. QUESTION: Section B-1 and L-6 FAR 52-216-1 Type of Contract reference a Cost-Plus Fixed Fee (CPFF) contract type, however, Section H-1 states the type of contract will be completed at time of award. Please verify the contract type as CPFF?

ANSWER: Section B is set up in the anticipated contract format. Section L-6 states that the government contemplates award of a cost-plus fixed fee term type contract. Upon award, section H6 will be completed with the negotiated contract type.

11. QUESTION: The RFP is requesting that the contractor agree to provide the total level of effort specified in the next sentence in performance of the work described in this contract. … A breakdown of labor categories and hours is set forth in paragraph (j). Paragraph (J) lists labor categories, level of experience, and hours for base and option years. In Attachment J, Personnel qualifications, there are additional job descriptions provide as follows: System Engineer, Facilities Technician, and Mechanical designer that do not aligned with section H-3j. Will the government be providing clarification between labor categories listed in H-3j and Attachment J-2 qualification descriptions? Or were these job descriptions listed in error?

ANSWER: See revised Attachment (2) Personnel Qualifications

12. QUESTION: How should contractors address material, ODCs and travel costs in their proposals?

ANSWER: Section L-15 VOLUME II – BUSINESS PROPOSAL is revised to include estimated travel and material costs as follows:

(a) MATERIAL/EQUIPMENT ESTIMATE (FOR EVALUATION PURPOSES ONLY)

The material/equipment estimate costs set forth MUST be included in each offeror's cost proposal for evaluation purposes only. During the term of the contract, the contractor will be reimbursed actual and verifiable material costs and associated expenses.

The Government estimates the material cost for this effort as follows:

Basic:	$900,000.00
Option 1 (if exercised)	$900,000.00
Option 2 (if exercised)	$900,000.00
Option 3 (if exercised)	$900,000.00
Option 4 (if exercised)	$900,000.00

(b) TRAVEL ESTIMATE (FOR EVALUATION PURPOSES ONLY)

The travel estimate set forth MUST be included in each offeror's cost proposal for evaluation purposes only. During the term of the contract, the contractor will be reimbursed actual and verifiable travel expenses in accordance with the federal travel guidelines.

The Government estimates the material cost for this effort as follows:

Basic:	$40,000.00
Option 1 (if exercised)	$40,000.00
Option 2 (if exercised)	$40,000.00
Option 3 (if exercised)	$40,000.00
Option 4 (if exercised)	$40,000.00

13. QUESTION: L-12 refers to a provision, Organizational conflict of Interest in Section H. Section H does not provide this provision. Please clarify.

ANSWER: Section H-9 ORGANIZATIONAL CONFLICT OF INTEREST is hereby added to section H of the contract as follows:

"H-9 ORGANIZATIONAL CONFLICT OF INTEREST

(a) Definitions

Organizational Conflict of Interest (OCI): FAR Part 2.1 defines "Organizational Conflict of Interest" as a situation in which: "...because of other activities or relationships with other persons, a person is unable or potentially unable to render impartial assistance or advice to the government, or the person's objectivity in performing the contract work is or might be otherwise impaired, or a person has an unfair competitive advantage." For the purposes of this contract, the term Organizational Conflict of Interest means that a relationship exists between the contractor (including the successor-in-interest, assignee or affiliated divisions, subsidiaries, employees, consultants, or subcontractors, hereinafter referred to as "Contractor") and another in which the underlying interests of the contractor and the other party, directly or indirectly (1) may influence, affect or diminish the contractor's ability to give impartial, technically sound, objective assistance, conclusions, advice or recommendations, or may otherwise result in a biased work product to or for the Government, or (2) may result in an unfair competitive advantage.

(b) Purpose

The purpose of this provision is to ensure that the Contractor (1) is able to give the Government impartial, technically sound, objective assistance, conclusions, advice or recommendations in its performance of this contract and (2) does not obtain an unfair competitive advantage over other parties by virtue of its performance of this contract.

(c) Scope

The requirements described herein shall apply to performance or participation by the Contractor, any of its affiliate organizations or their successors in interest (hereinafter referred to collectively as "Contractor") in the activities covered by this clause as a prime contractor, subcontractor, co-sponsor, joint venturer, consultant, or in any similar capacity. The financial, contractual, organizational and other interests of Contractor personnel performing work under this contract shall be deemed to be the interests of the Contractor for the purposes of determining the existence of an Organizational Conflict of Interest.

(d) Requirements

(1) The contractor shall evaluate Commercial-Off-the-Shelf software and related products and make recommendations to the government regarding its use or replacement.

(A) The Contractor warrants that, to the best of its knowledge and belief, it does not have any organizational conflict of interest, as defined in paragraph (a) above.

(B) The Contractor agrees that if during the performance of this contract, it discovers a potential or actual organizational conflict of interest with respect to this contract; it shall make an immediate and full disclosure in writing to the Procuring Contracting Officer (PCO). This disclosure must include a description of the actions which the contractor has taken or proposes to take to eliminate, avoid, or neutralize the conflict(s).

(C) If the Contractor's efforts in performing this contract require access to proprietary data of another company(ies), whether the proprietary data is in the possession of the other company or the Government, the Contractor shall obtain a written agreement from such other company(ies), to have access to and to use the data and to protect the data from unauthorized use or disclosure so long as the data remains proprietary. The Contractor shall upon request, provide the Contracting Officer or Contracting Officer's Technical Representative with copies of the agreement(s). This provision is not intended to protect proprietary data furnished voluntarily by companies without limitations as to use or data furnished by companies which is in the public domain.

(2) The contractor may have access to government information technology (IT) systems that contain sensitive information including, but not limited to, other organizations' proprietary information, Government procurement sensitive information, source selection information (see Federal Acquisition Regulation 2.101, 3.104-4 and 9.505-4), personally identifiable information subject to the Privacy Act 0f 1974, and information designated For Official Use Only.

(A) The Contractor agrees that such information will be accessed only to the extent necessary to perform the contract and that such information will be used by the Contractor only in the performance of the contract.

(B) The Contractor agrees that all its personnel having access to such information will be required to sign a nondisclosure statement substantially as Attachment (4) to this contract and that, upon request, it will provide the Contracting Officer or COR with copies of the nondisclosure agreement(s).

(e) Government Remedy

The Contractor agrees that any breach or violation of the warranties, restrictions, disclosures or non-disclosures set forth in this organizational conflicts of interest clause shall constitute a material and substantial breach of the terms, conditions and provisions of this contract and the government may, in addition to any other remedies available, terminate this contract for default."

14. QUESTION: Please clarify what is meant by "predecessor companies" in Section L-14.

ANSWER: Predecessor company in the past performance information paragraph means any company or division that existed prior to the current company or division form that is proposed to perform the task.

15. QUESTION: Can Prime contractors provide subcontractor's past performance as part of the five required past performance contracts?

ANSWER: Yes. See L-14(b)(4)(a).

16. QUESTION: Is it the expectation that the contractor will submit formal Earned Value Management Reporting, or is the contractor expected to deliver data files that will assist the government in populating their EVMS reporting tool?

ANSWER: The contractor is expected to deliver data files that will assist the government in populating its EVMS reporting tool

17. QUESTION: Per SOW 3.2.1.2.1and 3.2.1.2.2 reference is made to Earned Value Management reporting requirements, but the DFAR Clause 252.242.7001 is not called out in the listing of contract clauses (Section I) – is this an omission?

ANSWER: DFAR Clause 252.242-7001 is reserved.

18. QUESTION: Per SOW 3.2.1.2.1 and 3.2.1.2.2 reference is made to Earned Value Management reporting requirements, but there does not appear to be a CDRL that supports the delivery of standard CPR Formats 1-5. Will those reports be required on this contract?

ANSWER: CDRL A003 covers data required to assist in EVM reporting.

19. QUESTION: SOW 3.2.1.2.2 states "Earned Value Management reporting requirements will be defined based on the needs of individual tasks". For estimating purposes, how many tasks are anticipated to require EVMS reporting?

ANSWER: Up to four major tasks.

20. QUESTION: Per SOW 3.2.1.2.2 – EVMS reporting requirements will be required for some individual tasks, but CDRL A002 – Monthly Financial Status Report (MFSR), does not reference any Earned Value data requirements – please clarify.

ANSWER: CDRL A003 covers data required to assist in EVM reporting.

21. QUESTION: CDRL A003 – Monthly Cost Detail Download - states "This report is only mandatory if the project becomes subject to Earned Value Management reporting", but the data requirements for the report are not consistent with EVMS reporting. Please clarify how EVMS data will be incorporated into this report.

ANSWER: The data provided in this report will be used to assist in NRL's EVM reporting requirements

22. QUESTION: What is start date and duration of the Transition period so that contractors can provide an adequate schedule of phase-in activities as part of the Transition Plan?

ANSWER: The start date of the transition period will be at time of award with a duration anticipated at 90 days in accordance FAR 53.237-3.

23. QUESTION: The evaluation of the Technical / Management is broken down into 4 Subfactors 1. Personnel Qualification, 2. Company Experience, 3. Management Ability and 4. Past Performance. Please provide the weighting criteria of the subfactors.

ANSWER: Delete Section M-2 EVALUATION FACTORS FOR AWARD in its entirety and replace it with the following:

"M-2 EVALUATION FACTORS FOR AWARD

Proposals will be evaluated in accordance with the following criteria. All evaluation factors other than cost or price, when combined, are significantly more important than cost or price. The technical subfactors listed below are in descending order of importance."

PERSONNEL

QUALIFICATIONS

The following is a list of the personnel qualifications required for the subject procurement. One person is key in each category for which "Key Personnel" is indicated. Resumes must be submitted for all positions.

It is strongly desired that key personnel possess all the educational and experience qualifications expressed for their positions. In addition, all proposed key personnel must be U.S. Citizens and must be eligible for a TOP SECRET and SCI clearance.

It is preferable that non-key personnel be U.S. citizens and eligible for SECRET clearance; personnel who lack these qualifications are subject to the approval of the Contracting Officer's Representative.

For both key and non-key personnel, relevant experience while or prior to satisfying any educational requirement counts toward experience.

For both key and non-key personnel, where a B.S. degree is indicated, a bachelor's degree in the same field also qualifies; for example, a B.M.E. degree would be equivalent to a B.S.M.E. degree. Where a lower degree is required, possession of a higher degree in the same field also qualifies.

Definition of Experience Levels

Level 1	0-2 Years Experience
Level 2	2-5 Years Experience
Level 3	5-10 Years Experience
Level 4	10-15 Years Experience
Level 5	15+ Years Experience

REQUIREMENTS

The following paragraphs set forth the minimum requirements deemed necessary to perform the tasks set forth in the Statement of Work. The contractor should be capable of providing the personnel as directed by the Contracting Officer's Representative (COR) according to level-of-effort requirements in the following labor categories and with the experience indicated. Those personnel designated, as "key" must be available for work efforts on the first day after contract award.

1.0. PROGRAM MANAGER [Key Personnel]

a. (1) General Description

Serves as a single point of contact with the customer for all matters concerning technical progress and problems, program performance, schedule, cost, resources, and other program related activities. Assures the effective performance of program tasks.

(2) Sample Duties

Plans and directs the development of structures and electro-mechanical devices for spaceflight use. Monitors the day-to-day activities of all on-site work. Responsible for work assignments, prioritization of the work, and supervision of all on-site employees.

b. General Qualification Requirements

(1) Education, Training, and Experience

Bachelor's Degree in Engineering and a Master's Degree in Engineering Administration, Business Administration, or equivalent with minimum 15 years experience; or 20 years of Aerospace experience with 10 years as a Project Manager.

(2) Knowledge, Skills, and Abilities

Must have hardware experience in the design, development, and implementation of aerospace systems. Must have a knowledge of launch vehicles and launch vehicle requirements. Must have a general knowledge of thermal testing logistics and all other work described in the SOW. Must have the ability to resolve conflicts and to interface with people. Must be able to read and interpret drawings and specifications.

2. 0. BUYER

a. General Description

(1) Purpose

Interfaces with potential vendors for procurement purposes, and analyzes equipment requirements with respect to availability and cost.

(2) Duties

Recommends the most expeditious and cost-effective means of satisfying equipment requirements.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Levels 1 - 2. High school diploma and professional courses in related fields.

(2) Knowledge, Skills, and Abilities

Must have general knowledge of the requirements and aerospace certification and configuration control.

3.0. CLERICAL

a. General Description

(1) Purpose

Provides secretarial and administrative support to contractor management personnel.

(2) Duties

Prepares administrative and technical correspondence and reports (e.g., letters, travel orders and claims, training, security clearances, and work order requirements). Performs clerical duties requiring independent judgment and a thorough knowledge of organizational paperwork.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level3. High school diploma or secretarial/ clerical school that included word processing and computer courses.

(2) Knowledge, Skills, and Abilities

Must be able to operate a personal computer and the various application packages used in the office environment (i.e., WordPerfect, MS Word, Lotus 1-2-3, Excel, dBase, Harvard Graphics, etc.). Must have superior communication skills (both verbal and written), and the ability to organize and work effectively.

4.0.0 ENGINEER(s)

4.1. AEROSPACE ENGINEER

4.1.1. Concept & Design Aerospace Engineer

a. General Description

(1) Purpose

Conceptualizes, designs, analyzes, and tests aerospace system configuration and launch options to meet mission requirements.

(2) Duties

Conducts aerospace system configuration trade studies to develop requirements and to determine the type of configuration that best meets the requirements of individual subsystems (e.g., propulsion, RF, attitude control, power, and payload). Performs thermal and dynamic analyses of spacecraft mechanisms. Design, tests, and simulates spacecraft models and prototypes. Design, develop, and test prototype hardware in marketing in new technical areas such as energy conversion and transportation.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Levels 4. Bachelor's degree or higher from an accredited university of college in Aerospace Engineering, Physics, Mathematics, or related field.

(2) Knowledge, Skills, and Abilities

Must have knowledge of launch vehicle requirements, the space environment, aerospace materials, and spacecraft testing techniques. All Levels must have the ability to communicate effectively both orally and in writing.

4.1.2. Requirements Definition Aerospace Engineer

a. General Description

(1) Purpose

Conceptualizes, designs, analyzes, and tests aerospace system configuration and launch options to meet mission requirements.

(2) Duties

Conducts aerospace system configuration trade studies to develop requirements and to determine the type of configuration that best meets the requirements of individual subsystems (e.g., propulsion, RF, attitude control, power, and payload). Performs thermal and dynamic analyses of spacecraft mechanisms. Design, tests, and simulates spacecraft models and prototypes. Design, develop, and test prototype hardware in marketing in new technical areas such as energy conversion and transportation.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Levels 4. Bachelor's degree or higher from an accredited university of college in Aerospace Engineering, Physics, Mathematics, or related field.

(2) Knowledge, Skills, and Abilities

Must have knowledge of launch vehicle requirements, the space environment, aerospace materials, and spacecraft testing techniques. All Levels must have the ability to communicate effectively both orally and in writing.

4.1.3. Investigation & Development Aerospace Engineer

a. General Description

(1) Purpose

Conceptualizes, designs, analyzes, and tests aerospace system configuration and launch options to meet mission requirements.

(2) Duties

Conducts aerospace system configuration trade studies to develop requirements and to determine the type of configuration that best meets the requirements of individual subsystems (e.g., propulsion, RF, attitude control, power, and payload). Performs thermal and dynamic analyses of spacecraft mechanisms. Design, tests, and simulates spacecraft models and prototypes. Design, develop, and test prototype hardware in marketing in new technical areas such as energy conversion and transportation.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level 4. Bachelor's degree or higher from an accredited university of college in Aerospace Engineering, Physics, Mathematics, or related field.

(2) Knowledge, Skills, and Abilities

Must have knowledge of launch vehicle requirements, the space environment, aerospace materials, and spacecraft testing techniques. All Levels must have the ability to communicate effectively both orally and in writing.

4.2. MECHANICAL ENGINEER

4.2.1. Concept & Design Mechanical Engineer

a. General Description

(1) Purpose

To provide engineering support in the area of fluid flow, structures, testing, thermal control, and mechanical devices.

(2) Duties

Design and analyze the fabrication and testing of aerospace hardware. Resolve technical problems as they arise, provide engineering solutions based on calculations and test, and interface with the many complex technical disciplines, such as thermal, electrical, and structural to satisfy spacecraft level objectives. Analysis/design may involve temperatures ranging from that of liquid helium to substantially above ambient temperature. Fluid flow analysis may range from simple pipe flow to plume analysis. Plans and conducts tasks requiring considerable judgment in the evaluation and modification of mechanical engineering techniques, procedures, and criteria. Performs design, development, test, and evaluation of mechanical, electro-mechanical and thermal components and subassemblies deployed on space system platforms. Design,

development and testing of prototype hardware in new technical areas such as energy conversion and transportation. Plans and conducts modal analyses of structural components and systems using advanced digital signal processing equipment. Plans, develops and conducts launch site operations procedures.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level 4. Bachelor of Science Degree or higher in an appropriate field of engineering or physical science with experience in the development and qualification of aerospace hardware.

(2) Knowledge, Skills, and Abilities

Must have knowledge of the latest analytical techniques relevant to duties described above. Knowledge of mechanics of materials, metal fatigue, thermal control, liquid propellant systems, electric propulsion systems, and structural design of aerospace and space hardware as required by specific task assignment. Ability to use appropriate computer programs required for his area of expertise.

4.2.2. Trade Studies Mechanical Engineer

a. General Description

(1) Purpose

To provide engineering support in the area of fluid flow, structures, testing, thermal control, and mechanical devices.

(2) Duties

Design and analyze the fabrication and testing of aerospace hardware. Resolve technical problems as they arise, provide engineering solutions based on calculations and test, and interface with the many complex technical disciplines, such as thermal, electrical, and structural to satisfy spacecraft level objectives. Plans and conducts tasks requiring considerable judgment in the evaluation and modification of mechanical engineering techniques, procedures, and criteria. Performs design, development, test, and evaluation of mechanical, electro-mechanical and thermal components and subassemblies deployed on space system platforms.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level 3. Bachelor of Science Degree or higher in an appropriate field of engineering or physical science with experience in the development and qualification of aerospace hardware.

(2) Knowledge, Skills, and Abilities

Must have knowledge of the latest analytical techniques relevant to duties described above. Knowledge of mechanics of materials, metal fatigue, thermal control, liquid propellant systems, electric propulsion systems, and structural design of aerospace and space hardware as required by specific task assignment. Ability to use appropriate computer programs required for his area of expertise.

4.2.3. Launch Ops Support Mechanical Engineer

a. General Description

(1) Purpose

To provide engineering support in the area of launch site mechanical integration and test.

(2) Duties

Plans and conducts tasks requiring considerable judgment in the evaluation and modification of mechanical engineering techniques, procedures, and criteria. Plans, develops and conducts launch site operations procedures.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level 3. Bachelor of Science Degree or higher in an appropriate field of engineering or physical science with experience in the development and qualification of aerospace hardware.

(2) Knowledge, Skills, and Abilities

Must have knowledge of the latest analytical techniques relevant to duties described above. Knowledge of mechanics of materials, thermal control, liquid propellant systems, and structural design of aerospace and space hardware as required by specific task assignment. Ability to use appropriate computer programs required for his area of expertise.

4.2.4. Structure Design & Drafting Mechanical Engineer

a. General Description

(1) Purpose

To provide engineering support in the area of fluid flow, structures, testing, thermal control, and mechanical devices.

(2) Duties

Design and analyze the fabrication and testing of aerospace hardware. Resolve technical problems as they arise, provide engineering solutions based on calculations and test, and interface with the many complex technical disciplines, such as thermal, electrical, and structural to satisfy spacecraft level objectives. Plans and conducts tasks requiring considerable judgment in the evaluation and modification of mechanical engineering techniques, procedures, and criteria. Performs design, development, test, and evaluation of mechanical, electro-mechanical and thermal components and subassemblies deployed on space system platforms.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level 4. Bachelor of Science Degree or higher in an appropriate field of engineering or physical science with experience in the development and qualification of aerospace hardware.

(2) Knowledge, Skills, and Abilities

Must have knowledge of the latest analytical techniques relevant to duties described above. Knowledge of mechanics of materials, metal fatigue, thermal control, liquid propellant systems, electric propulsion systems, and structural design of aerospace and space hardware as required by specific task assignment. Ability to use appropriate computer programs required for his area of expertise.

4.2.5. Thermal Control Systems Mechanical Engineer

a. General Description

(1) Purpose

To provide engineering support in the area of thermal control.

(2) Duties

Design and analyze the fabrication and testing of aerospace hardware. Resolve technical problems as they arise, provide engineering solutions based on calculations and test, and interface with the many complex technical disciplines, such as thermal, electrical, and structural to satisfy spacecraft level objectives. Plans and conducts tasks requiring considerable judgment in the evaluation and modification of thermal engineering techniques, procedures, and criteria. Performs design, development, test, and evaluation of mechanical, electro-mechanical and thermal components and subassemblies deployed on space system platforms.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level 4. Bachelor of Science Degree or higher in an appropriate field of engineering or physical science with experience in the development and qualification of aerospace hardware.

(2) Knowledge, Skills, and Abilities

Must have knowledge of the latest analytical techniques relevant to duties described above. Knowledge of thermal control and space hardware as required by specific task assignment. Ability to use appropriate computer programs required for his area of expertise.

4.2.6. Design Fab & Test Mechanical Engineer

a. General Description

(1) Purpose

To provide engineering support in the area of fluid flow, structures, testing, thermal control, and mechanical devices.

(2) Duties

Design and analyze the fabrication and testing of aerospace hardware. Resolve technical problems as they arise, provide engineering solutions based on calculations and test, and interface with the many complex technical disciplines, such as thermal, electrical, and structural to satisfy spacecraft level objectives. Plans and conducts tasks requiring considerable judgment in the evaluation and modification of mechanical engineering techniques, procedures, and criteria. Performs design, development, test, and evaluation of mechanical, electro-mechanical and thermal components and subassemblies deployed on space system platforms.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level 4. Bachelor of Science Degree or higher in an appropriate field of engineering or physical science with experience in the development and qualification of aerospace hardware.

(2) Knowledge, Skills, and Abilities

Must have knowledge of the latest analytical techniques relevant to duties described above. Knowledge of mechanics of materials, metal fatigue, thermal control, liquid propellant systems, electric propulsion systems, and structural design of aerospace and space hardware as required by specific task assignment. Ability to use appropriate computer programs required for his area of expertise.

4.3. CONTROLS ENGINEER

4.3.1. Attitude Determination Controls Engineer

a. General Description

(1) Purpose

To provide mathematical controls analysis and performance assessment of position determination, attitude determination, and control systems for ground, airborne, and spacecraft control systems. Provide support to the Flight Operations Team assisting in Attitude Determination, Control System Configuration, and Anomaly Resolution.

(2) Duties

Perform analysis of control systems in response to contract task assignments. Perform stability analysis and parametric sensitivity studies on control systems, using computer programs developed in conjunction with the Space Engineering Department, and provide written reports documenting work and analysis.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Levels 4. Bachelor of Science Degree or higher in an appropriate field of engineering with course work in control theory plus 5 years experience as a controls analyst in the aerospace industry.

(2) Knowledge, Skills, and Abilities

Ability to analyze control systems and develop mathematical models of control systems from block diagrams. Ability to use computers to analyze control systems and to write required computer programs.

4.4. SYSTEMS ENGINEER

4.4.1. CONCEPT DEVELOPMENT SYSTEMS ENGINEER [Key Personnel]

a. General Description

(1) Purpose

To provide systems engineering support for a variety of space missions.

(2) Duties

Provides system-wide management of spacecraft programs, including conceptualization, design, development, manufacturing, test, launch, operation, demonstration, documentation.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level 5. Bachelor's degree in science, engineering or mathematics. 9 years experience in aerospace systems. (For the Key individual, this includes 5 years experience in system-wide management of spacecraft programs, including conceptualization, design, development, manufacturing, test, launch, operation, demonstration, documentation.)

(2) Knowledge, Skills, and Abilities

Experience in management/systems engineering for software development and/or maintenance for space missions.
Experience in management/systems engineering of the writing and editing of aerospace specifications.
Knowledge of and experience with mission operation, demonstration activities for real-time experimental spacecraft.
Familiarity with launch/operational/mission facilities of various government centers, e.g. Navy- Blossom Point, Air Force- Cape Canaveral and Vandenberg, NASA- Wallops Island, Johnson Space Center and Deep Space Network.
Familiarity with planning and scheduling activities for aerospace system development.
Experience in the managements/systems engineering of aerospace scientific and engineering data reduction.
Experience with standard application programs for Personal Computers.

4.4.2. Electrical Power Subsystem Engineer

a. General Description

(1) Purpose

To provide design and development engineering support for a variety of spacecraft electrical power systems.

(2) Duties

Proved design, development and test support for a variety of spacecraft electrical power systems.

b. General Qualification Requirements

(1) Education, Training and Experience

Experience level 4. Bachelor of Science in Electrical Engineering.
10 Years aerospace design, development engineering experience including 7 years design experience in spacecraft electrical power systems.

(2) Knowledge, Skills, and Abilities

Experience with design aerospace electrical product packaging.
Experience with environmental testing and qualification of aerospace electrical products.
Experience with computer aided modeling and analysis of electrical circuits.
Experience in writing/editing aerospace technical specifications.
Experience with standard application programs for Personal Computers.

4.5. Reaction Control Subsystems / Propulsion Engineer

a. General Description

(1) Purpose

To provide design and development engineering support for a variety of spacecraft reaction control and propulsion systems.

(2) Duties

Provide design, development and test support for a variety of spacecraft reaction control and propulsion systems.

b. General Qualification Requirements

(1) Education, Training and Experience

Experience level 4. Bachelor of Science in Engineering (Aerospace or Mechanical Engineering desired).
10 years aerospace design, development engineering experience.

(2) Knowledge, Skills, and Abilities

Experience in spacecraft and/or launch vehicle reaction control systems.
Experience with environmental testing and qualification of reaction control systems including: a) random vibration, b) acoustic testing, c) shock testing, d) temperature cycling, and d) extreme temperature.
Experience with safety assessment of reaction control systems.
First hand experience with composing, presenting and defending the safety program associated with the use of reaction control systems at the U.S. launch site.
Experience in writing/editing aerospace technical specifications.
Experience with complying with military safety regulations, at a minimum EWR 127-1.
Experience with standard application programs for Personal Computers.

4.6 Radio Frequency Engineer

a. General Description

(1) Purpose

To provide design and development engineering support for a variety of spacecraft radio frequency systems.

(2) Duties

Provide design, development and test support for a variety of spacecraft radio frequency systems.

b. General Qualification Requirements

(1) Education, Training and Experience

Experience level 4. Bachelor of Science in Electrical Engineering
10 years aerospace design, development engineering experience, including 8 years design experience in radio frequency systems.

(2) Knowledge, Skills, and Abilities

Experience with standard application programs for Personal Computers.
Experience submitting and processing Satellite communication licenses.
Experience with design of aerospace electrical product packaging.
Experience with environmental testing and qualification of aerospace electrical products.
Experience with computer aided modeling and analysis of electrical circuits.
Experience in writing/editing aerospace technical specifications

4.7. Quality Assurance Engineer [Key Personnel]

a. General Description

(1) Purpose

To provide quality assurance engineering support for a variety of spacecraft or spacecraft components.

(2) Duties

Execute quality assurance program plans and policies that guide the development of spacecraft flight hardware. Tailor and streamline quality assurance requirements to a particular aerospace hardware platform. Perform tests and inspections throughout life-cycle of system to ensure quality products are delivered.

b. General Qualification Requirements

(1) Education, Training and Experience

Experience level 4. Bachelor's degree in engineering.
10 years aerospace development engineering experience with spacecraft subsystems.

(2) Knowledge, Skills, and Abilities

Experience in space and ground subsystem design, development, and test.
Experience in executing quality assurance program plans and policies that guide the development of spacecraft flight hardware.
Ability to tailor and streamline quality assurance requirements to a particular aerospace hardware platform.
Experience in performing tests and inspections throughout life-cycle of system to ensure quality products are delivered.
Capable of holding a current NASA-certification in QA for Soldered Electrical Connections (NASA-STD-8739.3).
Capable of holding a current NASA-certification in QA for Crimp, Cable & Harness (NASA-STD-8739.4).

Capable of holding a current NASA-certification in QA for Surface Mount Initial (NASA-STD-8739.2).
Experience with standard application programs for Personal Computers.

4.8. Radio Frequency Antenna Engineer

a. General Description

(1) Purpose

To provide design and development engineering support for a variety of spacecraft radio frequency antenna systems.

(2) Duties

Provide design, development and test support for a variety of spacecraft radio frequency antenna systems.

b. General Qualification Requirements

(1) Education, Training and Experience

Experience level 4. Bachelor of Science in Electrical Engineering (for non-key personnel, degree may be in Aerospace Engineering or Physics).
10 years aerospace, design, development engineering experience, including 5 years design experience in radio frequency antenna systems.

(2) Knowledge, Skills, and Abilities

Experience with design of antenna product packaging.
Experience with environmental testing and qualification of aerospace antenna products.
Experience with computer aided modeling and analysis of antennas.
Experience in writing/editing aerospace technical specifications.
Experience with standard application programs for Personal Computers.

4.9. Telemetry, Tracking and Command Subsystem Engineer

a. General Description

(1) Purpose

To provide design and development engineering support for a variety of spacecraft telemetry, tracking and command systems.

(2) Duties

Provide design, development and test support for a variety of spacecraft telemetry, tracking and command systems.

b. General Qualification Requirements

(1) Education, Training and Experience

Experience level 4. Bachelor of Science in Electrical Engineering experience.
10 years aerospace design, development engineering experience, including 7 years design experience in telemetry, tracking and command systems.

(2) Knowledge, Skills, and Abilities

Experience with standard application programs for Personal Computers.
Experience with design of aerospace electrical product packaging.
Experience with environmental testing and qualification of aerospace electrical products.
Experience with computer aided modeling and analysis of electrical circuits.
Experience in writing/editing aerospace technical specifications.

4.10. Software Programming Engineer

a. General Description

(1) Purpose

To provide design and development engineering support for a variety of spacecraft software systems.

(2) Duties

Provide design, development and test support for a variety of spacecraft software systems.

b. General Qualification Requirements

(1) Education, Training and Experience

Experience level 4. Bachelor degree in computer science, science, engineering or mathematics.
10 years experience in programming digital computer systems.
5 years experience in flight and ground segment software for space systems (may be concurrent with first ten years requirement, above).

(2) Knowledge, Skills, and Abilities

Experience developing software for handling of scientific and engineering data from space systems.
Experience in setting up, operating and controlling various standard computer peripherals.
Experience in setting up, operating and controlling standard networks.
Experience running a variety of standard application programs on Sun, IBM (and compatible) and/or Apple Computers.
Experience with standard application programs for Personal Computers.

5.0. TECHNICIANS

5.1. ASSEMBLY TECHNICIAN (3 Key Personnel)

a. General Description

(1) Purpose

Responsible for the assembly of qualification and flight hardware, test equipment, and support facilities used in the development and testing of space hardware and systems.

(2) Duties

Provides assistance to engineers and analysts during spacecraft test, *integration, and* launch activities. Fabricates and assembles test fixtures and space system structures, mechanisms, and subassemblies from *engineering* drawings, rough sketches, and verbal *instructions.*

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Levels 3-5 or more. Associate's Degree in Airframe and Propulsion.

(2) Knowledge, Skills, and Abilities

Must be able to read and interpret drawings and blueprints. Must be able to operate power and hand tools Utilized in the aerospace environment. Must be able to plan, process, and assemble hardware from blueprints, procedures, and verbal instructions.

5.2. ON-SITE AND TRANSPORTATION SUPPORT FACILITIES TECHNICIAN (2 Key Personnel)

a. General Description

(1) Purpose

To provide logistics and facilities oversight to fabrication, test, and integration tasks, specifically thermal vacuum chambers and thermal ovens.

(2) Duties

Provides the facility support requirements associated with the mechanical development, assembly, testing, and integration of spaceflight structures and subassemblies. Operates and maintains environmental facilities used during test activities. Performs light fabrication and mechanical repair tasks.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level 3-4. Associates Degree with 5 years of experience or more; or, High School Diploma with 5 years of related experience.

(2) Knowledge, Skills, and Abilities

Must have knowledge in handling procedures, hand tools, and materials equipment.

5.3 Harness Assembly Technician

a. General Description

(1) Purpose

To provide harness fabrication support for a variety of spacecraft or spacecraft systems.

(2) Duties

Design and fabricate multi-subsystem flight harnesses.

b. General Qualification Requirements

(1) Education, Training and Experience

Experience Level 3. High School degree of higher.
10 years aerospace design, development engineering experience with a high school degree (or 5 years of such experience with a bachelor's degree in a scientific,

mathematical, or engineering discipline), including 5 years design experience in harness subsystems.

(2) Knowledge, Skills, and Abilities

Demonstrated ability in the design and fabrication of multi-subsystem flight harnesses.
Experience with standard application programs for Personal Computers.
Experience with environmental testing and qualification of aerospace electrical products
Experience in writing/editing aerospace technical specifications.
Hold a current NASA-certification in Crimp, Cable & Harness (NASA-STD-8739.4).
Experience with standard application programs for Personal Computers.

5.4. THERMAL CONTROL SYSTEM MECHANICAL TECHNICIAN

a. General Description

(1) Purpose

Responsible for the assembly of thermal qualification and flight hardware, test equipment, and support facilities used in the development and testing of thermal space hardware and systems.

(2) Duties

Provides assistance to engineers and analysts during thermal system test, *integration, and* launchsite activities. Fabricates and assembles test fixtures and space system thermal hardware and subassemblies from *engineering* drawings, rough sketches, and verbal *instructions.*

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Levels 4. Associate's Degree in Airframe.

(2) Knowledge, Skills, and Abilities

Must be able to read and interpret drawings and blueprints. Must be able to operate power and hand tools utilized in the aerospace environment. Must be able to plan, process, and assemble hardware from blueprints, procedures, and verbal instructions.

5.5. REACTION CONTROL SYSTEM MECHANICAL TECHNICIAN

a. General Description

(1) Purpose

Responsible for the assembly of reaction control system qualification and flight hardware, test equipment, and support facilities used in the development and testing of reaction control system space hardware and systems.

(2) Duties

Provides assistance to engineers and analysts during reaction control system test, *integration, and* launchsite activities. Fabricates and assembles test fixtures and reaction control system subassemblies from *engineering* drawings, rough sketches, and verbal *instructions.*

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Levels 4. Associate's Degree in Airframe and Propulsion.

(2) Knowledge, Skills, and Abilities

Must be able to read and interpret drawings and blueprints. Must be able to operate power and hand tools utilized in the aerospace environment. Must be able to plan, process, and assemble hardware from blueprints, procedures, and verbal instructions.

5.6. VIBRATION TESTING MECHANICAL TECHNICIAN

a. General Description

(1) Purpose

To perform mechanical fabrication and assembly under the direction of the engineer(s) in charge.

(2) Duties

Design and fabricate test hardware and prepare flight hardware for testing. Use simple machine shop tools to fabricate fitting and jigs.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level 3. Technical school graduate with experience as an aerospace technician. Background should include exposure to a variety of laboratory equipment.

(2) Knowledge, Skills, and Abilities

Ability to read mechanical schematics, log flow diagrams, and blueprints. Capable of performing tasks with minimal supervision. Experience in the area Vibration Testing required.

5.7. THERMAL VACUUM TESTING MECHANICAL TECHNICIAN

a. General Description

(1) Purpose

To perform mechanical fabrication and assembly under the direction of the engineer(s) in charge.

(2) Duties

Design and fabricate test hardware and prepare flight hardware for testing. Use simple machine shop tools to fabricate fitting and jigs. Operate vacuum pumps, leak detectors, and measuring equipment.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level 4. Technical school graduate with experience as an aerospace technician. Background should include exposure to a variety of laboratory equipment such as scales, flowmeters, pressure/vacuum gauges, temperature sensors, etc.

(2) Knowledge, Skills, and Abilities

Ability to read mechanical schematics, log flow diagrams, and blueprints. Should be familiar with compressed gas handling and storage. Capable of performing tasks with minimal supervision. Experience in the areas of Thermal Control Systems.

5.8. DESIGN, FAB & TEST MECHANICAL TECHNICIAN

a. General Description

(1) Purpose

To perform mechanical fabrication and assembly under the direction of the engineer(s) in charge.

(2) Duties

Design and fabricate test hardware and prepare flight hardware for testing. Use simple machine shop tools to fabricate fitting and jigs.

b. General Qualification Requirements

(1) Education, Training, and Experience

Experience Level 3. Technical school graduate with experience as an aerospace technician. Background should include exposure to a variety of laboratory equipment.

(2) Knowledge, Skills, and Abilities

Ability to read mechanical schematics, log flow diagrams, and blueprints. Capable of performing tasks with minimal supervision. Experience in the area Vibration Testing required.

6.0 Orbit and Trajectory Analyst

a. General Description

(1) Purpose

To provide orbit dynamics/trajectory analysis support for a variety of space missions.

(2) Duties

Provide orbit dynamics/trajectory analysis support for a variety of space missions.

b. General Qualification Requirements

(1) Education, Training and Experience

Experience level 4. Bachelor degree in science, engineering or mathematics.
10 years experience in aerospace systems in general.
5 years experience in orbit dynamics/trajectory analysis as relates to aerospace (may be concurrent with 10 years requirement, above)

(2) Knowledge, Skills, and Abilities

Familiarity with standard software programs for the analysis and prediction of orbits and trajectories.

Ability to perform scientific computer programming.
Familiarity with encounter planning for aerospace systems.
Experience in running standard application programs for Personal Computers.

7.0 QUALITY ASSURANCE SPECIALIST [Key Personnel]

a. General Description

(1) Purpose

To inspect flight hardware, flight support equipment, spares, and engineering units for compliance with the requirements of the applicable documents that are specified in the individual task assignment.

(2) Duties

Verify that the hardware, parts, and materials are in compliance with the procurement document and engineering drawings. Ensure that hardware, parts, and materials are being handled and stored properly to prevent degradation and/or damage. Ensure compliance with the configuration control plans, and verify the configuration of the deliverable hardware. Ensure that processes pertaining to soldering, electronic welding, stitchwire welding, structural welding, etc. are being compiled with by the fabricator and/or operator. Perform structural, sensor, and antenna alignments using advanced optical inspection equipment.

b. General Qualification Requirements

(1) Education, Training and Experience

Experience Level 4. A High School Diploma and experience in all aspects of mechanical and electrical fabrication, receiving and shipping inspection. Must have experience in quality control pertaining to aerospace hardware and/or systems.

(2) Knowledge, Skills, and Abilities

Thorough knowledge of quality assurance activities as defined in the NASA Handbooks (NHB 5300.4 series) and ability to implement the requirements with little supervision. Knowledge of advanced inspection equipment.