

NNNGO7CA22C

Mechanical Systems

Engineering Services

#1B

CONTRACT

2/1/07

AWARD/CONTRACT		1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350) ⇒	RATING	PAGE OF PAGES 1 74	
2. CONTRACT NO. (Proc. Inst. Ident.) NO. NNG07CA22C		3. EFFECTIVE DATE February 1, 2007	4. REQUISITION/PURCHASE REQUEST/PROJECT NO.		
5. ISSUED BY: CODE 210.3 NASA Goddard Space Flight Center Attn: Contracting Officer Greenbelt Road Greenbelt, MD 20771		6. ADMINISTERED BY (If other than item 5) CODE			
7. NAME AND ADDRESS OF CONTRACTOR (No., street, city, county, State and ZIP) Bastion Technologies, Inc. 17625 El Camino Real, Suite 330 Houston, Texas 77058			CODE 1PM71	FACILITY CODE	
8. DELIVERY <input type="checkbox"/> FOB ORIGIN <input type="checkbox"/> OTHER		9. DISCOUNT FOR PROMPT			
10. SUBMIT INVOICES (4 copies unless other-wise specified) TO THE ADDRESS SHOWN IN: ⇒ ITEM Section G.7					
11. SHIP TO/MARK FOR CODE Specified on Individual Delivery Orders		12. PAYMENT WILL BE MADE BY: CODE Code 155 Cost and Commercial Accounts Department, Code 155 Goddard Space Flight Center Greenbelt, Maryland 20771			
13. AUTHORITY FOR USING OTHER THAN FULL AND OPEN N/A <input type="checkbox"/> 10 U.S.C. 2304(c) <input type="checkbox"/> 41 U.S.C. 253(c)			14. ACCOUNTING AND APPROPRIATION DATA TO BE SPECIFIED		
15A. ITEM NO.	15B. SUPPLIES/SERVICES	15C. QTY	15D. UNIT	15E. UNIT PRICE	15F. AMOUNT
	Mechanical Systems Engineering Services II/B				
15G. TOTAL AMOUNT OF CONTRACT ⇒					\$ 200,000,000.

(X)	SEC.	DESCRIPTION	PAGE(S)	(X)	SEC.	DESCRIPTION	PAGE(S)
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	A	SOLICITATION/CONTRACT FORM		X	I	CONTRACT CLAUSES	54-73
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CONTRACTING OFFICER WILL COMPLETE ITEM 17 OR 18 AS APPLICABLE

17 <input checked="" type="checkbox"/> CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is required to sign this document and return <u>TWO</u> copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents (s) this award/contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein.)		18. <input type="checkbox"/> AWARD (Contractor is not required to sign this document.) Your offer on Solicitation Number _____ including the additions or changes made by you which additions or changes are set forth in full above, is hereby accepted as to the items listed above and on any continuation sheets. This award consummates the contract which consists of the following documents: (a) the Government's solicitation and your offer, and (b) this award/contract. No further contractual document is necessary.	
19A. NAME AND TITLE OF SIGNER (Type or print) <u>Jorge Hernandez, President</u>		20A. NAME OF CONTRACTING OFFICER KAREN M. PLACE	
19B. NAME OF CONTRACTOR BY <u>[Signature]</u> (Signature of person authorized to sign)	19C. DATE SIGNED 02/01/2007	20B. UNITED STATES OF AMERICA BY <u>[Signature]</u> (Signature of Contracting Officer)	20C. DATE SIGNED 02/01/2007

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**SECTION B OF CONTRACT NNG07CA22C
SUPPLIES OR SERVICES AND PRICE/COST**

B.1 DELIVERABLE REQUIREMENTS (GSFC 52.211-90) (OCT 1988)

The Contractor shall provide the services to NASA's Goddard Space Flight Center as described in Section C of this contract and the Contractor shall deliver the following documentations and reports:

Item	Description	Reference	Schedule	Delivery Method/Addressee (s)
1	Services and Deliverables In Accordance With Statement of Work and Task Orders	As defined in individual task orders	As defined in individual task orders.	See Task Order(s)
2	Task Plans	Clauses B.10, H.7	14 days after receipt of request for task plan	Web-based Task Order Management System (TOMS)
3	Monthly Progress Reports	Clause C.2	15 th calendar day of each month	Electronic Format/ COTR (Code 540); Task Monitor; & CO (letter transmittal only)
4	Final Task Report	Clause C.2	Due 5 days prior to task order end date	Electronic Format/ COTR; Task Monitor; CO (letter transmittal only); & Hard Copy/CASI
5	NASA Financial Management Reports	Clauses G.1, G.9	Monthly and Quarterly	Electronic Format/ CO; COTR; TM; Resource Analyst (Code 540) & Finance Office (Code 155)
6	DD Form 1419 - DOD Industrial Plant Equipment Requisition	Clause G.10	30 days prior to approval need date	DD Form 1419 - Hard Copy/CO & Industrial Property Officer (Code 273)
7	Financial Report of NASA Property in the Custody of Contractors (NF 1018)	Clause G.12	Annual Report Due By October 15th and Final Report Due As Specified	NF 1018 - Hard Copy /Code 157; DCMA-Property Administrator; & Code 273

**SECTION B OF CONTRACT NNG07CA22C
SUPPLIES OR SERVICES AND PRICE/COST**

Item	Description	Reference	Schedule	Delivery Method/Addressee(s)
8	Safety & Health Reporting	Clause H.1 1852.223-70 & Clause H.5	Quarterly in accordance with Clause H.5	<i>Electronic Format /Code 250; & CO</i>
9	GSFC Form 24-27 (LISTS Form) & Personal Identity Verification (PIV) Documentation	Clause H.2	As required in accordance with Clause H.2	<i>GSFC 24-27 & PIV documents - Electronic Format /COTR; CO; & Code 240</i>
10	LISTS Report	Clause H.2	10th calendar day of each month	<i>Electronic Format /COTR; & Code 240</i>
11	Equal Opportunity Reports	Clause I.1, 52.222-26	As Specified	<i>Electronic Format</i>
12	Insurance Notification	Clause I.1, 52.228-7	As Required	<i>Electronic Format</i>
13	Subcontract Notification	Clause I.1 52.244-2	30 days prior to subcontract award date	<i>Electronic Format / Contracting Officer (CO)</i>
14	IT Security Plan and Assessment Plans	Clause I.1 1852.204-76 (Deviation)	30 days after contract award	<i>Electronic Format / Contracting Officer (CO)</i>
15	Organizational Conflicts of Interest Avoidance Plan	Clause H.9 1852.237-72	30 days after contract award	<i>Hard Copy Contracting Officer (CO)</i>

NOTE: Transportation Classification: Item 1, Deliverable(s) designated Class I, II and III, shall be in accordance with Clause D.1, all others, unless specified (electronic format, etc.), are considered Class IV; Items 2 through 15, Deliverables, unless specified (electronic format, etc.), are considered Class IV and shall be shipped via the most advantageous commercial transportation means considered to be in the best interest of the Government.

(End of clause)

**SECTION B OF CONTRACT NNG07CA22C
SUPPLIES OR SERVICES AND PRICE/COST**

B.2 MINIMUM/MAXIMUM AMOUNT OF SUPPLIES OR SERVICES

(a) The minimum amount of supplies or services that shall be ordered during the effective period of this contract is **\$1,000,000**. The maximum amount of supplies or services that may be ordered during the effective period of this contract is **\$200,000,000**.

(b) The minimum amount is reached when the sum of the dollar amounts of all ordered supplies or services, except for any adjustments made pursuant to the Limitation of Cost or Limitation of Funds clause, equals or exceeds the minimum amount stated in paragraph (a).

(c) The maximum amount is reached when the sum of the dollar amounts of all ordered supplies or services, except for any adjustments made pursuant to the Limitation of Cost or Limitation of Funds clause, equals the maximum amount stated in paragraph (a).

(d) The maximum amount, if reached, precludes the issuance of further orders for supplies or services under this contract. However, reaching the maximum amount does not preclude adjustments to the dollar amounts of existing placed orders, for actions that are within the scope of the placed orders, and which are made pursuant to existing contract authority, such as the Changes clause.

(e) The Contracting Officer may adjust the maximum ordering value unilaterally on an annual basis. Historic, current and/or projected workload requirements will be used to determine the amount of upward adjustment. In no event shall the adjustment exceed **30%** of the awarded (\$200M) maximum ordering value.

(End of text)

B.3 ESTIMATED COST INCREASES

(a) The parties estimate that performance of this contract, exclusive of any fee, will not cost the Government more than the estimated cost specified in any individual task order.

(b) The Contractor shall notify the Contracting Officer in writing when the Contractor has reason to believe that -

(1) The costs the Contractor expects to incur under any individual task order, exclusive of fee, when added to all costs previously incurred, will exceed 75 percent of the estimated cost specified in any individual task order; or

**SECTION B OF CONTRACT NNG07CA22C
SUPPLIES OR SERVICES AND PRICE/COST**

(2) The total estimated cost for the performance of any individual task order, exclusive of any fee, will be substantially less than had been previously estimated.

(c) Notification shall not be delayed pending preparation of a proposal. A proposal is required to support a request for an increase in the estimated cost of a task order. The proposal should be submitted as soon as possible after the above notification but no later than **30** days before the incurred costs are expected to exceed the estimated cost. This will allow adequate time for the Government to evaluate the proposal and to mutually establish any increase in estimated cost with the Contractor.

(d) (1) The proposal shall be submitted in the following format unless some other format is directed or approved by the Contracting Officer:

Incurred costs to date
Projected cost to completion
Total cost at completion
Current negotiated estimated cost
Requested increase in estimated cost

(2) The "projected cost to completion" shall consist of the following "other than cost or pricing data" unless the Contracting Officer requests or approves the submittal of a greater or lesser amount of information:

(i) Elements of cost with supporting detail for estimated direct labor hours, direct and indirect rates, materials and subcontracts, and other elements.

(ii) Supporting explanation for the increases and projections, sufficient for the Government to understand the reasons for the increased estimated cost.

(End of text)

B. 4 ORDERING (52.216-18) (OCT 1995)

(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from the award date of this contract through a five (5) year period afterwards (effective ordering period).

(b) All delivery orders or task orders are subject to the terms and conditions of this contract. In the event of conflict between a

**SECTION B OF CONTRACT NNG07CA22C
SUPPLIES OR SERVICES AND PRICE/COST**

delivery order or task order and this contract, the contract shall control.

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

(End of clause)

B.5 ORDER LIMITATIONS (52.216-19) (OCT 1995)

(a) Minimum order. When the Government requires supplies or services covered by this contract in an amount of less than \$1,000, the Government is not obligated to purchase, nor is the Contractor obligated to furnish, those supplies or services under the contract.

(b) Maximum order. The Contractor is not obligated to honor--

(1) Any order for a single item in excess of \$50,000,000

(2) Any order for a combination of items in excess of \$50,000,000; or

(3) A series of orders from the same ordering office within 30 days that together call for quantities exceeding the limitation in subparagraph (1) or (2) above.

(c) If this is a requirements contract (i.e., includes the Requirements clause at subsection 52.216-21 of the Federal Acquisition Regulation (FAR)), the Government is not required to order a part of any one requirement from the Contractor if that requirement exceeds the maximum-order limitations in paragraph (b) above.

(d) Notwithstanding paragraphs (b) and (c) above, the Contractor shall honor any order exceeding the maximum order limitations in paragraph (b), unless that order (or orders) is returned to the ordering office within 7 days after issuance, with written notice stating the Contractor's intent not to ship the item (or items) called for and the reasons. Upon receiving this notice, the Government may acquire the supplies or services from another source.

(End of clause)

**SECTION B OF CONTRACT NNG07CA22C
SUPPLIES OR SERVICES AND PRICE/COST**

B. 6 INDEFINITE QUANTITY (52.216-22) (OCT 1995)

(a) This is an indefinite-quantity contract for the supplies or services specified, and effective for the period stated, in the Schedule. The quantities of supplies and services specified in the Schedule are estimates only and are not purchased by this contract.

(b) Delivery or performance shall be made only as authorized by orders issued in accordance with the Ordering clause. The Contractor shall furnish to the Government, when and if ordered, the supplies or services specified in the Schedule up to and including the quantity designated in the Schedule as the "maximum. The Government shall order at least the quantity of supplies or services designated in the Schedule as the "minimum."

(c) Except for any limitations on quantities in the Order Limitations clause or in the Schedule, there is no limit on the number of orders that may be issued. The Government may issue orders requiring delivery to multiple destinations or performance at multiple locations.

(d) Any order issued during the effective period of this contract and not completed within that period shall be completed by the Contractor within the time specified in the order. The contract shall govern the Contractor's and Government's rights and obligations with respect to that order to the same extent as if the order were completed during the contract's effective period; provided, that the Contractor shall not be required to make any deliveries under this contract after one (1) year from the end of the contract's effective ordering period.

(End of clause)

B. 7 PAYMENT FOR OVERTIME PREMIUMS (52.222-2) (JUL 1990)

(a) The use of overtime is authorized under this contract if the overtime premium cost does not exceed \$0 or the overtime premium is paid for work--

(1) Necessary to cope with emergencies such as those resulting from accidents, natural disasters, breakdowns of production equipment, or occasional production bottlenecks of a sporadic nature:

(2) By indirect-labor employees such as those performing duties in connection with administration, protection, transportation, maintenance, standby plant protection, operation of utilities, or accounting:

**SECTION B OF CONTRACT NNG07CA22C
SUPPLIES OR SERVICES AND PRICE/COST**

(3) To perform tests, industrial processes, laboratory procedures, loading or unloading of transportation conveyances' and operations in flight or afloat that are continuous in nature and cannot reasonably be interrupted or completed otherwise, or

(4) That will result in lower overall costs to the Government.

(b) Any request for estimated overtime premiums that exceeds the amount specified above shall include all estimated overtime for contract completion and shall--

(1) Identify the work unit: e.g., department or section in which the requested overtime will be used, together with present workload, staffing, and other data of the affected unit sufficient to permit the Contracting Officer to evaluate the necessity for the overtime;

(2) Demonstrate the effect that denial of the request will have on the contract delivery or performance schedule;

(3) Identify the extent to which approval of overtime would affect the performance or payments in connection with other Government contracts, together with identification of each affected contract; and

(4) Provide reasons why the required work cannot be performed by using multishift operations or by employing additional personnel.

(End of clause)

B. 8 ESTIMATED COST AND AWARD FEE (1852.216-85) (SEPTEMBER 1993)

The estimated cost of this contract is **\$(to be negotiated by task order*)**. The maximum available award fee, excluding base fee, if any, is **\$(to be negotiated by task order*)**. The base fee is \$0. Total estimated cost, base fee, and maximum award fee are **\$(to be negotiated by task order*)**. **(*in accordance with Attachment B)**

(End of clause)

**SECTION B OF CONTRACT NNG07CA22C
SUPPLIES OR SERVICES AND PRICE/COST**

B.9 CONTRACT FUNDING (1852.232-81) (JUN 1990)

(a) For purposes of payment of cost, exclusive of fee, in accordance with the Limitation of Funds clause, the total amount allotted by the Government to this contract is \$**TBD**. This allotment is for **TBD** and covers the following estimated period of performance:
TBD

(b) An additional amount of \$**TBD** is obligated under this contract for payment of fee.

(End of clause)

B.10 SUPPLEMENTAL TASK ORDERING PROCEDURES

(a) Upon Initiation, the Contractor shall submit a "task plan" in accordance with the Clause entitled "Task Ordering Procedure" of this contract, the Contractor shall prepare its estimate of the labor hours, labor categories, indirect costs, and other direct costs required to perform the task order requirements. The Contractor shall use the labor categories and labor and indirect rates that shall not exceed the rates listed in Attachment B to calculate the proposed estimated cost to perform the task order requirements.

(b) The Contractor agrees that only those appropriate labor and indirect cost rates, which may be less than but shall not exceed the rates found in the applicable Attachment B, shall be used to calculate the proposed estimated costs for all task orders issued in accordance with the "Task Ordering Procedure" clause of this contract.

(c) The Government and Contractor agree that the maximum available award fee percentage specified in Attachment B shall be used to calculate the maximum award fee dollars on all task orders issued in accordance with the "Task Ordering Procedure" clause of this contract. The Government shall solely determine the earned award fee under the contract.

(d) Upon initiation, the Government will designate each task order as a "Services" or "End Item(s)" task order. The following clauses shall apply specifically to the appropriately designated task orders:

- *Services*: Clauses E.4, G.5 and Clause I.1-52.246-25 shall apply to task orders issued for services.
- *End Item(s)*: Clauses D.1, E.5, G.6, and Clause I.1-52.246-24 shall apply to task orders issued for end items.

**SECTION B OF CONTRACT NNG07CA22C
SUPPLIES OR SERVICES AND PRICE/COST**

(e) Task Orders will be issued using a Web-based Task Order Management System (TOMS) method.

(End of Text)

[END OF SECTION]

SECTION C OF CONTRACT NNG07CA22C
DESCRIPTION/SPECIFICATIONS/WORK STATEMENT

C.1 SCOPE OF WORK (GSFC 52.211-91) (FEB 1991)

The Contractor shall provide the personnel, materials, and facilities, except as otherwise specified in this contract, necessary to perform the work and to furnish the items specified in Section B of this contract in accordance with the Statement of Work (Section J, Attachment A) and task orders issued hereunder.

(End of clause)

C.2 REPORTS OF WORK

(a) Monthly progress reports. The Contractor shall submit monthly progress reports of all work accomplished covering all tasks active during each month of contract performance. Reports shall be in narrative form and brief and informal in content. They shall include a quantitative description of overall progress, an indication of any current problems, which may impede performance and proposed corrective action, discussions of the work to be performed and any CONUS/OCONUS trips planned and/or completed during the next monthly reporting period. Trip discussions shall include a description of the following: (1) date(s) of travel; (2) destination; (3) purpose; and (4) costs of travel (i.e. airfare, per diem (hotels/meals), rental vehicles, etc.)

(b) Final Task Report. The Contractor shall submit a final task report that summarizes the results of the entire task work, including recommendations and conclusions based on the experience and results obtained. The final task report should include tables, graphs, diagrams, curves, sketches, photographs, and drawings in sufficient detail to explain comprehensively the results achieved under the contract.

(c) The last page of the final report shall be a completed Standard Form (SF) 298, Report Documentation Page.

(d) Submission. The Contractor shall submit the report required by this clause as follows:

**SECTION C OF CONTRACT NNG07CA22C
DESCRIPTION/SPECIFICATIONS/WORK STATEMENT**

[M=Monthly, F=Final]

Copies	Report Type	Addressee	Mail Code
1	M, F	Contracting Officer (ltr transmittal only)	210.3
1	M, F	Contracting Officer's Technical Representative (COTR)	540
Copies	Report Type	Addressee	Mail Code
1	M, F	Task Monitor	See Task Order
1	F	Center for AeroSpace Information (CASI) http://www.sti.nasa.gov	

(e) Submission dates. Monthly reports shall be submitted by the 15th day of the month following the month being reported. If the contract is awarded beyond the middle of a month, the first monthly report shall cover the period from award until the end of the following month. The final report for each task order shall be due 5 days prior to task order end date.

(End of Text)

C.3 COMPUTER SOFTWARE AND DATA RIGHTS

Computer software and data related to the computer software such as its documentation and training materials are to be delivered with unlimited rights. No limited rights data or restricted computer software will be accepted for delivery, except for the following COTS computer software products: **None**

(End of Text)

[END OF SECTION]

**SECTION D OF CONTRACT NNG07CA22C
PACKAGING AND MARKING**

D. 1 PACKAGING, HANDLING, AND TRANSPORTATION (1852.211-70) (SEPT 2005)

NOTE: This clause applies to all CPAF Task orders for End-Items.

(a) The Contractor shall comply with NPR 6000.1, "Requirements for Packaging, Handling, and Transportation for Aeronautical and Space Systems, Equipment, and Associated Components" as may be supplemented by the statement of work or specifications of this contract, for all items designated as Class I, II, or III.

(b) The Contractor's packaging, handling, and transportation procedures may be used, in whole or in part, subject to the written approval of the Contracting Officer, provided--

(1) The Contractor's procedures are not in conflict with any requirements of this contract, and

(2) The requirements of this contract shall take precedence in the event of any conflict with the Contractor's procedures.

(c) The Contractor must place the requirements of this clause in all subcontracts for items that will become components of deliverable Class I, II, or III items.

(End of clause)

[END OF SECTION]

**SECTION E OF CONTRACT NNG07CA22C
INSPECTION AND ACCEPTANCE**

**E. 1 MATERIAL INSPECTION AND RECEIVING REPORT NOT REQUIRED
(GSFC 52.246-94) (APR 1989)**

NASA FAR Supplement clause 1852.246-72 of this contract requires the furnishing of a Material Inspection and Receiving Report (MIRR) (DD Form 250 series) at the time of each delivery under this contract. However, a MIRR is not required for paper/electronic deliverables (i.e. reports).

(End of clause)

E. 2 INSPECTION SYSTEM (SUBCONTRACTS) (GSFC 52.246-100) (JULY 2000)

In performance of this contract, the Contractor shall impose inspection system requirements on subcontractors and suppliers to ensure the required quality of supplies or services. Monitoring of the Contractor's system for inspecting subcontractors will be accomplished through the combined efforts of NASA/GSFC personnel and the delegated Government agency. The authority and responsibility of the delegated agency will be defined in a letter of contract administration delegation.

(End of clause)

E. 3 INSPECTION SYSTEM RECORDS (GSFC 52.246-102) (OCT 1988)

The Contractor shall maintain records evidencing inspections in accordance with the Inspection clause of this contract for five years after delivery of all items and/or completion of all services called for by the contract.

(End of clause)

E. 4 INSPECTION OF SERVICES--COST-REIMBURSEMENT (52.246-5) (APR 1984)

NOTE: This clause applies to all CPAF Task Orders for Services.

(a) Definition. "Services," as used in this clause, includes services performed, workmanship, and material furnished or used in performing services.

SECTION E OF CONTRACT NNG07CA22C
INSPECTION AND ACCEPTANCE

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

(c) The Government has the right to inspect and test all services called for by the contract, to the extent practicable at all places and times during the term of the contract. The Government shall perform inspections and tests in a manner that will not unduly delay the work.

(d) If any of the services performed do not conform with contract requirements, the Government may require the Contractor to perform the services again in conformity with contract requirements, for no additional fee. When the defects in services cannot be corrected by reperformance, the Government may

- (1) require the Contractor to take necessary action to ensure that future performance conforms to contract requirements and
- (2) reduce any fee payable under the contract to reflect the reduced value of the services performed.

(e) If the Contractor fails to promptly perform the services again or take the action necessary to ensure future performance in conformity with contract requirements, the Government may (1) by contract or otherwise, perform the services and reduce any fee payable by an amount that is equitable under the circumstances or (2) terminate the contract for default.

(End of clause)

E. 5 INSPECTION OF RESEARCH AND DEVELOPMENT-COST-REIMBURSEMENT
(52.246-8) (MAY 2001)

NOTE: This clause applies to all CPAF Task Orders for End-Items.

(a) *Definitions.* As used in this clause—
"Contractor's managerial personnel" means the Contractor's directors, officers, managers, superintendents, or equivalent representatives who have supervision or direction of—

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

SECTION E OF CONTRACT NNG07CA22C
INSPECTION AND ACCEPTANCE

(2) All or substantially all of the Contractor's operation at any one plant or separate location where the contract is being performed;
or

(3) A separate and complete major industrial operation connected with performing this contract.

"Work" includes data when the contract does not include the Warranty of Data clause.

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

(c) The Government has the right to inspect and test all work called for by the contract, to the extent practicable at all places and times, including the period of performance, and in any event before acceptance. The Government may also inspect the plant or plants of the Contractor or its subcontractors engaged in the contract performance. The Government shall perform inspections and tests in a manner that will not unduly delay the work.

(d) If the Government performs any inspection or test on the premises of the Contractor or a subcontractor, the Contractor shall furnish and shall require subcontractors to furnish all reasonable facilities and assistance for the safe and convenient performance of these duties.

(e) Unless otherwise provided in the contract, the Government shall accept work as promptly as practicable after delivery, and work shall be deemed accepted 90 days after delivery, unless accepted earlier.

(f) At any time during contract performance, but no later than 6 months (or such other time as may be specified in the contract) after acceptance of all of the end items (other than designs, drawings, or reports) to be delivered under the contract, the Government may require the Contractor to replace or correct work not meeting contract requirements. Time devoted to the replacement or correction of such work shall not be included in the computation of the above time period. Except as otherwise provided in paragraph (h) of this clause, the cost of replacement or correction shall be determined as specified in the Allowable Cost and Payment clause, but

SECTION E OF CONTRACT NNG07CA22C
INSPECTION AND ACCEPTANCE

no additional fee shall be paid. The Contractor shall not tender for acceptance work required to be replaced or corrected without disclosing the former requirement for replacement or correction, and, when required, shall disclose the corrective action taken.

(g) (1) If the Contractor fails to proceed with reasonable promptness to perform required replacement or correction, the Government may-

(i) By contract or otherwise, perform the replacement or correction, charge to the Contractor any increased cost, or make an equitable reduction in any fixed fee paid or payable under the contract;

(ii) Require delivery of any undelivered articles and shall have the right to make an equitable reduction in any fixed fee paid or payable under the contract; or

(iii) Terminate the contract for default.

(2) Failure to agree on the amount of increased cost to be charged the Contractor or to the reduction in fixed fee shall be a dispute.

(h) Notwithstanding paragraphs (f) and (g) of this clause, the Government may at any time require the Contractor to remedy by correction or replacement, without cost to the Government, any failure by the Contractor to comply with the requirements of this contract, if the failure is due to-

(1) Fraud, lack of good faith, or willful misconduct on the part of the Contractor's managerial personnel; or

(2) The conduct of one or more of the Contractor's employees selected or retained by the Contractor after any of the Contractor's managerial personnel has reasonable grounds to believe that the employee is habitually careless or unqualified.

(i) This clause shall apply in the same manner to a corrected or replacement end item or components as to work originally delivered.

(j) The Contractor has no obligation or liability under the contract to correct or replace articles not meeting contract requirements at time of delivery, except as provided in this clause or as may otherwise be specified in the contract.

(k) Unless otherwise provided in the contract, the Contractor's obligations to correct or replace Government-furnished property shall be governed by the clause pertaining to Government property.

(End of clause)

**SECTION E OF CONTRACT NNG07CA22C
INSPECTION AND ACCEPTANCE**

E. 6 HIGHER-LEVEL CONTRACT QUALITY REQUIREMENT (52.246-11) (FEB 1999)

The Contractor shall comply with the higher-level quality standard selected below.

(a) When conducting services at GSFC the contractor shall follow GSFC ANSI/ISO/ASQ Q9001-2000 quality management system (QMS) requirements as documented on-line in the GSFC QMS system. In addition, the contractor's quality system shall be compliant with ISO 9001. Additional quality requirements may also be specified in individual task order authorizations.

"Compliant" means that the contractor has defined, documented, and will continually implement during the term of the contract management-approved methods of operation that conform to the requirements given in the above-cited International Standard.

(b) Attachment F - Mission Assurance Plan (MAP)

(End of clause)

E. 7 MATERIAL INSPECTION AND RECEIVING REPORT (1852.246-72) (AUG 2003)

(a) At the time of each delivery to the Government under this contract, the Contractor shall furnish a Material Inspection and Receiving Report (DD Form 250 series) prepared in an original copy and sufficient other copies to accomplish the following distribution:

(1) Via mail and marked "Advance Copy", one copy each to the Contracting Officer, the Contracting Officer's Technical Representative (if designated in the contract), and to the cognizant Administrative Contracting Officer, if any.

(2) Via mail, the original and 1 copy (unfolded) to the shipment address (delivery point) specified in Section F of this contract. Mark the exterior of the envelope "CONTAINS DD FORM 250". This must arrive prior to the shipment.

(3) With shipment in waterproof envelope (one copy) for the consignee.

(4) If the shipment address is not directly to the Goddard Space Flight Center (Greenbelt) or Goddard Space Flight Center (Wallops) central receiving areas, then one copy of the DD Form 250 must be provided (via mail) to one on the following addresses depending upon whether this contract is with GSFC Greenbelt or GSFC Wallops:

**SECTION E OF CONTRACT NNG07CA22C
INSPECTION AND ACCEPTANCE**

Receiving and Inspection (Code 279), Goddard Space Flight Center, Greenbelt, MD 20771.

Receiving and Inspection (Bldg. F16), Wallops Flight Facility, Wallops Island VA 23337.

(b) The Contractor shall prepare the DD Form 250 in accordance with NASA FAR Supplement 18-46.6. The Contractor shall enclose the copies of the DD Form 250 in the package or seal them in a waterproof envelope, which shall be securely attached to the exterior of the package in the most protected location.

(c) When more than one package is involved in a shipment, the Contractor shall list on the DD Form 250, as additional information, the quantity of packages and the package numbers. The Contractor shall forward the DD Form 250 with the lowest numbered package of the shipment and print the words "CONTAINS DD FORM 250" on the package.

(End of clause)

E.8 ACCEPTANCE--SINGLE LOCATION (GSFC 52.246-92) (SEPT 1989)

The Contracting Officer or authorized representative will accomplish acceptance at Goddard Space Flight Center. For the purpose of this clause, the Contracting Officer's Technical Representative named in this contract is the authorized representative. The Contracting Officer reserves the right to unilaterally designate a different Government agent as the authorized representative. The Contractor will be notified by a written notice or by a copy of the delegation of authority if different representative is designated.

(End of clause)

[END OF SECTION]

**SECTION F OF CONTRACT NNG07CA22C
DELIVERIES OR PERFORMANCE**

F.1 PLACE OF PERFORMANCE--SERVICES (GSFC 52.237-92) (OCT 1988)

The services specified by this contact shall be performed at the following location(s): NASA/Goddard Space Flight Center, Other NASA Centers (subject to on-site availability, if required), and **Contractor's facilities:**

Bastion Technologies, Inc.
7404 Executive Place, Lanham. MD 20706

Orbital Sciences Corporation
5011 Herzel Place, Beltsville, MD 20705

(End of clause)

F.2 EFFECTIVE ORDERING PERIOD

The Government may issue tasks for a period of five (5) years from the effective date of the contract. Task Orders shall not be issued after the expiration of this effective ordering period.

(End of Text)

F.3 SHIPPING INSTRUCTIONS--CENTRAL RECEIVING (GSFC 52.247-94) (JUL 1993)

Shipments of the items required under this contract shall be to:

Receiving Officer
Building 16W
Code 279
Goddard Space Flight Center
Greenbelt, Maryland 20771

Marked for:

Technical Monitor (Name):	Code:
Building:	Room:
Contract No.	Task Order No.
Item(s) No.	

The above to be specified in each task order.

**SECTION F OF CONTRACT NNG07CA22C
DELIVERIES OR PERFORMANCE**

Compliance with this clause is necessary to assure verification of delivery and acceptance and prompt payment.

(End of clause)

F. 4 STOP-WORK ORDER (52.242-15) (AUG 1989)--ALTERNATE I (APR 1984)

(a) The Contracting Officer may, at any time, by written order to the Contractor, require the Contractor to stop all, or any part, of the work called for by this contract for a period of 90 days after the order is delivered to the Contractor, and for any further period to which the parties may agree. The order shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Within a period of 90 days after a stop-work order is delivered to the Contractor, or within any extension of that period to which the parties shall have agreed, the Contracting Officer shall either--

(1) Cancel the stop-work order; or

(2) Terminate the work covered by the order as provided in the Termination clause of this contract.

(b) If a stop-work order issued under this clause is canceled or the period of the order or any extension thereof expires, the Contractor shall resume work. The Contracting Officer shall make an equitable adjustment in the delivery schedule, the estimated cost, the fee, or a combination thereof, and in any other terms of the contract that may be affected.

(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and

(2) The Contractor asserts its right to the adjustment within 30 days after the end of the period of work stoppage; provided, that, if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive and act upon the claim submitted at any time before final payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the

**SECTION F OF CONTRACT NNG07CA22C
DELIVERIES OR PERFORMANCE**

Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.

(End of clause)

F.5 F.O.B. DESTINATION (52.247-34) (NOV 1991)

(a) The term "f.o.b. destination," as used in this clause, means--

(1) Free of expense to the Government, on board the carrier's conveyance, at a specified delivery point where the consignee's facility (plant, warehouse, store, lot, or other location to which shipment can be made) is located, and

(2) Supplies shall be delivered to the destination consignee's wharf (if destination is a port city and supplies are for export), warehouse unloading platform, or receiving dock, at the expense of the Contractor. The Government shall not be liable for any delivery, storage, demurrage, accessorial, or other charges involved before the actual delivery (or "constructive placement" as defined in carrier tariffs) of the supplies to the destination, unless such charges are caused by an act or order of the Government acting in its contractual capacity. If rail carrier is used, supplies shall be delivered to the specified unloading platform of the consignee. If motor carrier (including "piggyback") is used, supplies shall be delivered to truck tailgate at the unloading platform of the consignee, except when the supplies delivered meet the requirements of Item 568 of the National Motor Freight Classification for "heavy or bulky freight". When supplies meeting the requirements of the referenced Item 568 are delivered, unloading (including movement to the tailgate) shall be performed by the consignee, with assistance from the truck driver, if requested. If the Contractor uses rail carrier or freight forwarder for less than carload shipments, the Contractor shall ensure that the carrier will furnish tailgate delivery, when required, if transfer to truck is required to complete delivery to consignee.

**SECTION F OF CONTRACT NNG07CA22C
DELIVERIES OR PERFORMANCE**

(b) The Contractor shall--

(1) (i) Pack and mark the shipment to comply with contract specifications; or

(ii) In the absence of specifications, prepare the shipment in conformance with carrier requirements;

(2) Prepare and distribute commercial bills of lading;

(3) Deliver the shipment in good order and condition to the point of delivery specified in the contract;

(4) Be responsible for any loss of and/or damage to the goods occurring before receipt of the shipment by the consignee at the delivery point specified in the contract;

(5) Furnish a delivery schedule and designate the mode of delivering carrier; and

(6) Pay and bear all charges to the specified point of delivery.

(End of clause)

[END OF SECTION]

**SECTION G OF CONTRACT NNG07CA22C
CONTRACT ADMINISTRATION DATA**

G.1 FINANCIAL MANAGEMENT REPORTING (GSFC 52.242-90) (FEB 2004)

(a) Requirements. This clause provides the supplemental instructions referred to in NASA FAR Supplement (NFS) clause 1852.242-73. The NFS clause and NASA Procedural Requirements (NPR) 9501.2D, "NASA Contractor Financial Management Reporting", establish report due dates and other financial management reporting requirements. NPR 9501.2D permits withholding of payment for noncompliance.

(b) Supplemental instructions. (1) Monthly (NF 533M) reports are required. Quarterly (NF 533Q) reports are also required. The reporting structure shall be in accordance with Attachment C of this contract.

(2) As stated in NPR 9501.2D, NASA strongly encourages electronic contractor cost reporting. The preferred formats are Excel and Adobe. Contact the Contracting Officer for any E-Mail addresses that are not provided or which become noncurrent.

Distribution shall be as follows:

Contracting Officer, Code 210.3
Email: Kathleen.M.Pierson@nasa.gov

Contracting Officer's Technical Representative, Code 540
Email: Lyle.G.Knight@nasa.gov

Resources Analyst, Code 540 (Electronic Format via CD
and Hardcopy for The Summary Sheets)
Email: Wilma.M.Warren@nasa.gov

Regional Finance Office Cost Team, Code 155
E-Mail: rfocateam@listserv.gsfc.nasa.gov

Administrative Contracting Officer (if delegated)

(c) Web sites. (1) NPR 9501.2D, "NASA Contractor Financial Management Reporting":

[http://nodis3.gsfc.nasa.gov/displayDir.cfm?InternalID=N PR 9501 002D
&page name=main](http://nodis3.gsfc.nasa.gov/displayDir.cfm?InternalID=NPR9501002D&pageName=main)

(2) NF 533 Tutorial: (for training purposes only)

<http://genesis.gsfc.nasa.gov/nf533/nf533.htm>

(End of clause)

**SECTION G OF CONTRACT NNG07CA22C
CONTRACT ADMINISTRATION DATA**

G.2 CONTRACTOR USE OF GSFC LIBRARY (GSFC 52.245-90) (AUG 1993)

The Contractor's professional employees performing work under this contract are granted borrowing privileges at the Goddard Space Flight Center (GSFC) Library.

(a) The Contractor shall establish procedures to account for borrowed materials and to ensure their timely return. "Timely return" means prior to the expiration of the borrowing period, prior to the termination of employment of the particular employee, or prior to the expiration of this contract, whichever comes first.

(b) The Contractor shall initiate borrowing privileges for its employees by contacting the GSFC Librarian. The Librarian will require the Contractor to provide the name and title of the company official responsible for ensuring compliance with (a) above. The responsible official will be required to indicate the level of control for the issuance of Library charge plates and whether the countersignature of the responsible company official will be required on Goddard Library Card Applications. The GSFC Librarian may impose additional information requirements if Library privileges are requested for employees that do not have permanent GSFC badges.

(c) The Contractor shall be responsible for all items lost, destroyed or not returned. Such items shall be immediately replaced by the Contractor at no cost to the Government. The GSFC Librarian may revoke library privileges at any time during the performance of the contract if the Contractor fails to comply with this clause or is experiencing an inordinate amount of loss or destruction of library materials. Discontinuance of library privileges shall not entitle the Contractor to an increase in the cost or price for contract performance or to any other adjustment to the contract.

(End of clause)

**G.3 PROPERTY CLAUSE APPLICABILITY--ON-SITE AND OFF-SITE (GSFC 52.245-96)
(JULY 2004)**

(a) Performance of this contract requires that contractor personnel and any furnished and/or acquired government property be located at both Government controlled and managed premises (on-site) and at contractor controlled and managed premises (off-site). The requirements for control and accountability of government property differ depending upon the location of the property. The applicability of the clauses in this contract to on-site and to off-site locations is indicated below.

**SECTION G OF CONTRACT NNG07CA22C
CONTRACT ADMINISTRATION DATA**

(b) Clauses applicable to both on-site and off-site locations. FAR clause 52.245-5, "Government Property (Cost Reimbursement, Time-and-Material, or Labor-Hour Contracts" except that paragraph (e) does not apply to on-site locations.

NASA FAR Supplement clause 1852.245-70, "Contractor Requests for Government-Owned Equipment".

GSFC clause 52.245-92, "Repair or Replacement of Government Property--Special Conditions", if included.

GSFC clause 52.245-97, "Contractor Acquired Property--NASA Conditions".

(c) Clauses applicable only to off-site locations.

NASA FAR Supplement clause 1852.245-73, "Financial Reporting of NASA Property in the Custody of Contractors"

NASA FAR Supplement clause 1852.245-76, "List of Government-Furnished Property", if included.

(d) Clauses applicable only to on-site locations.

NASA FAR Supplement clause 1852.245-71, "Installation-Accountable Government Property (Alternate I)".

NASA FAR Supplement clause 1852.245-77, "List of Installation-Accountable Property and Services".

GSFC clause 52.245-93, "Reports of Contractor Acquired Government Property"

(End of clause)

**G.4 CONTRACTOR ACQUIRED PROPERTY--NASA CONDITIONS (GSFC 52.245-97)
(SEP 1998)**

NASA FAR Supplement 1845.502-70 establishes general and specific conditions that apply to this contract for various categories of contractor acquired property.

(End of clause)

**SECTION G OF CONTRACT NNG07CA22C
CONTRACT ADMINISTRATION DATA**

G.5 AWARD FEE FOR SERVICE CONTRACTS (1852.216-76) (JUNE 2000)

NOTE: This clause applies to all Task Orders for Services.

(a) The contractor can earn award fee from a minimum of zero dollars to the maximum stated in NASA FAR Supplement clause 1852.216-85, "Estimated Cost and Award Fee" in this contract.

(b) Beginning 6 months after the effective date of this contract, the Government shall evaluate the Contractor's performance every 6 months to determine the amount of award fee earned by the contractor during the period. The Contractor may submit a self-evaluation of performance for each evaluation period under consideration. These self-evaluations will be considered by the Government in its evaluation. The Government's Fee Determination Official (FDO) will determine the award fee amounts based on the Contractor's performance in accordance with the MSES II/B Performance Evaluation Plan. The plan may be revised unilaterally by the Government prior to the beginning of any rating period to redirect emphasis.

(c) The Government will advise the Contractor in writing of the evaluation results. The Cost and Commercial Accounts Department, Code 155, will make payment based on issuance of a unilateral modification by Contracting Officer.

(d) After 85% of the potential award fee has been paid, the Contracting Officer may direct the withholding of further payment of award fee until a reserve is set aside in an amount that the Contracting Officer considers necessary to protect the Government's interest. This reserve shall not exceed 15 percent of the total potential award fee.

(e) The amount of award fee which can be awarded in each evaluation period is limited to the amounts set forth in the Performance Evaluation Plan. Award fee which is not earned in an evaluation period cannot be reallocated to future evaluation periods.

(f) (1) Provisional award fee payments will be made under this contract pending the determination of the amount of fee earned for an evaluation period. If applicable, provisional award fee payments will be made to the Contractor on a monthly basis. The total amount of award fee available in an evaluation period that will be provisionally paid is the lesser of 80% or the prior period's evaluation score.

(2) Provisional award fee payments will be superseded by the final award fee evaluation for that period. If provisional payments exceed

**SECTION G OF CONTRACT NNG07CA22C
CONTRACT ADMINISTRATION DATA**

the final evaluation score, the Contractor will either credit the next payment voucher for the amount of such overpayment or refund the difference to the Government, as directed by the Contracting Officer.

(3) If the Contracting Officer determines that the Contractor will not achieve a level of performance commensurate with the provisional rate, payment of provisional award fee will be discontinued or reduced in such amounts as the Contracting Officer deems appropriate. The Contracting Officer will notify the Contractor in writing if it is determined that such discontinuance or reduction is appropriate.

(4) Provisional award fee payments will be made prior to the first award fee determination by the Government.

(g) Award fee determinations are unilateral decisions made solely at the discretion of the Government.

(End of clause)

G. 6 AWARD FEE FOR END ITEM CONTRACTS (1852.216-77) (JUN 2000)

NOTE: This clause applies to all CPAF Task Orders for End-Items.

(a) The contractor can earn award fee, or base fee, if any, from a minimum of zero dollars to the maximum stated in NASA FAR Supplement clause 1852.216-85, "Estimated Cost and Award Fee" in this contract. All award fee evaluations, with the exception of the last evaluation, will be interim evaluations. At the last evaluation, which is final, the Contractor's performance for each End-Item Task Order will be evaluated to determine total earned award fee. No award fee or base fee will be paid to the Contractor if the final award fee evaluation is "poor/unsatisfactory."

(b) Beginning 6 months after the effective date of this contract, the Government will evaluate the Contractor's interim performance every 6 months to monitor Contractor performance prior to contract completion and to provide feedback to the Contractor. The evaluation will be performed in accordance with MSES II/B Performance Evaluation Plan to this contract. The Contractor may submit a self-evaluation of performance for each period under consideration. These self-evaluations will be considered by the Government in its evaluation. The Government will advise the Contractor in writing of the evaluation results. The plan may be revised unilaterally by the Government prior to the beginning of any rating period to redirect emphasis.

(c) (1) Base fee, if applicable, will be paid in monthly installments based on the percent of completion of the work as determined by the Contracting Officer.

SECTION G OF CONTRACT NNG07CA22C
CONTRACT ADMINISTRATION DATA

(2) Interim award fee payments will be made to the Contractor based on each interim evaluation. The amount of the interim award fee payment is limited to the lesser of the interim evaluation score or 80% of the fee allocated to that period less any provisional payments made during the period. All interim award fee payments will be superseded by the final award fee determination.

(3) Provisional award fee payments will be made under this contract pending each interim evaluation. If applicable, provisional award fee payments will be made to the Contractor on a monthly basis. The amount of award fee which will be provisionally paid in each evaluation period is limited to 80% of the prior interim evaluation score. Provisional award fee payments made each evaluation period will be superseded by the interim award fee evaluation for that period. If provisional payments made exceed the interim evaluation score, the Contractor will either credit the next payment voucher for the amount of such overpayment or refund the difference to the Government, as directed by the Contracting Officer. If the Government determines that (i) the total amount of provisional fee payments will apparently substantially exceed the anticipated final evaluation score, or (ii) the prior interim evaluation is "poor/unsatisfactory," the Contracting Officer will direct the suspension or reduction of the future payments and/or request a prompt refund of excess payments as appropriate. Written notification of the determination will be provided to the Contractor with a copy to the Deputy Chief Financial Officer (Finance).

(4) All interim (and provisional, if applicable) fee payments will be superseded by the fee determination made in the final award fee evaluation. The Government will then pay the Contractor, or the Contractor will refund to the Government the difference between the final award fee determination and the cumulative interim (and provisional, if applicable) fee payments. If the final award fee evaluation is "poor/unsatisfactory", any base fee paid will be refunded to the Government.

(5) Payment of base fee, if applicable, will be made based on submission of an invoice by the Contractor. Payment of award fee will be made by the Cost and Commercial Accounts Department, Code 155, will make payment based on issuance of a unilateral modification by Contracting Officer.

(d) Award fee determinations are unilateral decisions made solely at the discretion of the Government.

(End of clause)

**SECTION G OF CONTRACT NNG07CA22C
CONTRACT ADMINISTRATION DATA**

G. 7 SUBMISSION OF VOUCHERS FOR PAYMENT (1852.216-87) (MAR 1998)

(a) The designated billing office for cost vouchers for purposes of the Prompt Payment clause of this contract is indicated below. Public vouchers for payment of costs shall include a reference to the number of this contract.

(b)(1) If the contractor is authorized to submit interim cost vouchers directly to the NASA paying office, the original voucher and one copy should be submitted to:

Cost and Commercial Accounts Department
Code 155
Goddard Space Flight Center
Greenbelt, Maryland 20771

(2) For any period that the Defense Contract Audit Agency has authorized the Contractor to submit interim cost vouchers directly to the Government paying office, interim vouchers are not required to be sent to the Auditor, and are considered to be provisionally approved for payment subject to final audit.

(3) Copies of vouchers should be submitted as may be directed by the Contracting Officer.

(c) If the contractor is not authorized to submit interim cost vouchers directly to the paying office as described in paragraph (b), the contractor shall prepare and submit vouchers as follows:

(1) One original and one copy Standard Form (SF)1034, SF 1035, or equivalent Contractor's attachment to the Auditor.

DCAA Houston Branch Office
8876 Gulf Freeway, Suite 500
Houston, Texas 77017
Email: dcaa-fao3521@dcaa.mil
Tel. 713-948-3300 x223
Fax: 713-948-3312

(2) One "**Courtesy**" copy to the Contracting Officer submitted electronically.

(3) The Contracting Officer may designate other recipients as required.

**SECTION G OF CONTRACT NNG07CA22C
CONTRACT ADMINISTRATION DATA**

(d) Public vouchers for payment of fee shall be prepared similarly to the procedures in paragraphs (b) or (c) of this clause, whichever is applicable, and be forwarded to the Contracting Officer.

This is the designated billing office for fee vouchers for purposes of the Prompt Payment clause of this contract.

(e) In the event that amounts are withheld from payment in accordance with provisions of this contract, a separate voucher for the amount withheld will be required before payment for that amount may be made.

(End of clause)

G. 8 DESIGNATION OF NEW TECHNOLOGY REPRESENTATIVE AND PATENT REPRESENTATIVE (1852.227-72) (JULY 1997)

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

Title	Office Code	Address (including zip code)
New Technology Representative	504	Goddard Space Flight Center Greenbelt, MD 20771
Patent Representative	140.1	Goddard Space Flight Center Greenbelt, MD 20771

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

(End of clause)

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**G. 9 NASA CONTRACTOR FINANCIAL MANAGEMENT REPORTING (1852.242-73)
(NOV 2004)**

a) The Contractor shall submit NASA Contractor Financial Management Reports on NASA Forms 533 in accordance with the instructions in NASA Procedural Requirements (NPR) 9501.2, NASA Contractor Financial Management Reporting, and on the reverse side of the forms, as supplemented in the Schedule of this contract. The detailed reporting categories to be used, which shall correlate with technical and schedule reporting, shall be set forth in the Schedule. Contractor implementation of reporting requirements under this clause shall include NASA approval of the definitions of the content of each reporting category and give due regard to the Contractor's established financial management information system.

(b) Lower level detail used by the Contractor for its own management purposes to validate information provided to NASA shall be compatible with NASA requirements.

(c) Reports shall be submitted in the number of copies, at the time, and in the manner set forth in the Schedule or as designated in writing by the Contractor Officer. Upon completion and acceptance by NASA of all contract line items, the Contracting Officer may direct the Contractor to submit Form 533 reports on a quarterly basis only, report only when changes in actual cost incur, or suspend reporting altogether.

(d) The Contractor shall ensure that its Form 533 reports include accurate subcontractor cost data, in the proper reporting categories, for the reporting period.

(e) If during the performance of this contract NASA requires a change in the information or reporting requirements specified in the Schedule, or as provided for in paragraph (a) or (c) of this clause, the Contracting Officer shall effect that change in accordance with the Changes clause of this contract.

(End of clause)

**G. 10 CONTRACTOR REQUESTS FOR GOVERNMENT-OWNED EQUIPMENT
(1852.245-70) (JUL 1997)**

(a) "Equipment," as used in this clause, means commercially available items capable of stand-alone use, including those to be acquired for incorporation into special test equipment or special tooling.

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(b)(1) Upon determination of need for any Government-owned equipment item for performance of this contract, the contractor shall provide to the contracting officer a written request justifying the need for the equipment and the reasons why contractor-owned property cannot be used, citing the applicable FAR or contract authority for use of Government-owned equipment. Equipment being acquired as a deliverable end item listed in the contract or as a component for incorporation into a deliverable end item listed in the contract is exempt from this requirement.

(2) The contractor's request shall include a description of the item in sufficient detail to enable the Government to screen its inventories for available equipment or to purchase equipment. For this purpose, the contractor shall (i) prepare a separate DD Form 1419, DOD Industrial Plant Equipment Requisition, or equivalent format, for each item requested and (ii) forward it through the contracting officer to the Industrial Property Officer at the cognizant NASA installation at least 30 days in advance of the date the contractor intends to acquire the item. Multiple units of identical items may be requested on a single form. Instructions for preparing the DD Form 1419 are contained in NASA FAR Supplement 1845.7102. If a certificate of nonavailability is not received within that period, the contractor may proceed to acquire the item, subject to having obtained contracting officer consent, if required, and having complied with any other applicable provisions of this contract.

(c) Contractors who are authorized to conduct their own screening using the NASA Equipment Management System (NEMS) and other Government sources of excess property shall provide the evidence of screening results with their request for contracting officer consent. Requests to purchase based on unsuitability of items found shall include rationale for the determined unsuitability.

(End of clause)

**G.11 INSTALLATION-ACCOUNTABLE GOVERNMENT PROPERTY (1852.245-71)
(NOV 2004)**

(a) The Government property described in the clause at 1852.245-77, List of Installation-Accountable Property and Services, shall be made available to the Contractor on a no-charge basis for use in performance of this contract. This property shall be utilized only within the physical confines of the NASA installation that provided the property. Under this clause, the Government retains accountability for, and title to, the property, and the contractor assumes the following user responsibilities:

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(1) Notify the cognizant property custodian, COTR, and the Installation Security Officer immediately if theft of Government property is suspected or property cannot be located

(2) Identify Government property equipment that is no longer considered necessary for performance of the contract.

(3) Ensure that equipment is turned in to the Property Disposal Officer through the cognizant property custodian when no longer needed. This is the only acceptable procedure for disposal of Government property.

(4) Do not relocate Government property within Government premises or remove Government property from Government premises without written approval.

(5) Ensure that Government property, including property leased to the Government, is used only for the purposes of performing the contract.

(6) Ensure that Government property is protected and conserved.

The Contractor shall establish and adhere to a system of written procedures for compliance with the user responsibilities. Such procedures must include holding employees liable, when appropriate, for loss, damage, or destruction of Government property.

(b)(1) The official accountable record keeping, physical inventory, financial control, and reporting of the property subject to this clause shall be retained by the Government and accomplished by the installation Supply and Equipment Management Officer (SEMO) and Financial Management Officer. If this contract provides for the contractor to acquire property, title to which will vest in the Government, the following additional procedures apply:

(i) The contractor's purchase order shall require the vendor to deliver the property to the installation central receiving area;

(ii) The contractor shall furnish a copy of each purchase order, prior to delivery by the vendor, to the installation central receiving area;

(iii) The contractor shall establish a record of the property as required by FAR 45.5 and 1845.5 and furnish to the Industrial Property Officer a DD Form 1149 Requisition and Invoice/Shipping Document (or installation equivalent) to transfer accountability to the Government within 5 working days after receipt of the property by the contractor. The contractor is accountable for all contractor-acquired property until the property is transferred to the Government's accountability.

(iv) Contractor use of Government property at an off-site location and off-site subcontractor use require advance approval of the contracting officer and notification of the SEMO. The contractor

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shall assume accountability and financial reporting responsibility for such property. The contractor shall establish records and property control procedures and maintain the property in accordance with the requirements of FAR Part 45.5 until its return to the installation.

(2) After transfer of accountability to the Government, the contractor shall continue to maintain such internal records as are necessary to execute the user responsibilities identified in paragraph (a) and document the acquisition, billing, and disposition of the property. These records and supporting documentation shall be made available, upon request, to the SEMO and any other authorized representatives of the contracting officer.

(End of clause)

G. 12 FINANCIAL REPORTING OF NASA PROPERTY IN THE CUSTODY OF CONTRACTORS (1852.245-73) (OCT 2003)

(a) The Contractor shall submit annually a NASA Form (NF) 1018, NASA Property in the Custody of Contractors, in accordance with the provisions of 1845.505-14, the instructions on the form, subpart 1845.71, and any supplemental instructions for the current reporting period issued by NASA.

(b)(1) Subcontractor use of NF 1018 is not required by this clause; however, the Contractor shall include data on property in the possession of subcontractors in the annual NF 1018.

(2) The Contractor shall mail the original signed NF 1018 directly to the Goddard Space Flight Center (GSFC), General Accounting Department, General Ledger Section, Code 157, Greenbelt, MD 20771, unless the Contractor uses the NF 1018 Electronic Submission System (NESS) for report preparation and submission.

(3) One copy shall be submitted (through the Department of Defense (DOD) Property Administrator if contract administration has been delegated to DOD) to the following address:

Goddard Space Flight Center, Supply and Equipment Management Branch, Code 273, Greenbelt, MD 20771--unless the Contractor uses the NF 1018 Electronic Submission System (NESS) for report preparation and submission.

(c)(1) The annual reporting period shall be from October 1 of each year through September 30 of the following year. The report shall be submitted in time to be received by October 15. The information contained in these reports is entered into the NASA accounting system to reflect current asset values for agency financial statement

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purposes. Therefore, it is essential that required reports be received no later than October 15. Some activity may be estimated for the month of September, if necessary, to ensure the NF 1018 is received when due. However, contractors' procedures must document the process for developing these estimates based on planned activity such as planned purchases or NASA Form 533 (NF 533 Contractor Financial Management Report) cost estimates. It should be supported and documented by historical experience or other corroborating evidence, and be retained in accordance with FAR Subpart 4.7, Contractor Records Retention. Contractors shall validate the reasonableness of the estimates and associated methodology by comparing them to actual activity once that data is available, and adjust them accordingly. In addition, differences between the estimated cost and the actual cost must be adjusted during the reporting period. Contractors shall have formal policies and procedures, which address the validation of NF 1018 data, including data from subcontractors, and the identification and timely reporting of errors. The objective of this validation is to ensure that information reported is accurate and in compliance with the NASA FAR Supplement. If errors are discovered on NF 1018 after submission, the contractor shall immediately contact the cognizant NASA Center Industrial Property Officer (IPO) to discuss corrective action.

(2) The Contracting Officer may, in NASA's interest, withhold payment until a reserve not exceeding \$25,000 or 5 percent of the amount of the contract, whichever is less, has been set aside, if the Contractor fails to submit annual NF 1018 reports in accordance with 1845.505-14 and any supplemental instructions for the current reporting period issued by NASA. Such reserve shall be withheld until the Contracting Officer has determined that NASA has received the required reports. The withholding of any amount or the subsequent payment thereof shall not be construed as a waiver of any Government right.

(d) A final report shall be submitted within 30 days after disposition of all property subject to reporting when the contract performance period is complete in accordance with (b)(1) through (3) of this clause.

(End of clause)

G.13 LIST OF GOVERNMENT-FURNISHED PROPERTY (1852.245-76) (OCT 1988)

For performance of work under this contract, the Government will make available Government property identified in each individual task order, if applicable, of this contract on a no-charge-for-use basis. The Contractor shall use this property in the performance of this contract at applicable site (s) identified in each individual task

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order and at other location(s) as may be approved by the Contracting Officer. Under the FAR 52.245 Government property clause of this contract, the Contractor is accountable for the identified property.

(End of clause)

**G.14 LIST OF INSTALLATION-ACCOUNTABLE PROPERTY AND SERVICES
(1852.245-77) (JUL 1997)**

In accordance with the clause at 1852.245-71, Installation-Accountable Government Property, the Contractor is authorized use of the types of property and services listed below, to the extent they are available, in the performance of this contract within the physical borders of the installation which may include buildings and space owned or directly leased by NASA in close proximity to the installation, if so designated by the Contracting Officer.

(a) Office space, work area space, and utilities. Government telephones are available for official purposes only; pay telephones are available for contractor employees for unofficial calls.

(b) General- and special-purpose equipment, including office furniture.

(1) Equipment to be made available is listed in each individual task order, if applicable. The Government retains accountability for this property under the clause at 1852.245-71, Installation-Accountable Government Property, regardless of its authorized location.

(2) If the Contractor acquires property, title to which vests in the Government pursuant to other provisions of this contract, this property also shall become accountable to the Government upon its entry into Government records as required by the clause at 1852.245-71, Installation-Accountable Government Property.

(3) The Contractor shall not bring to the installation for use under this contract any property owned or leased by the Contractor, or other property that the Contractor is accountable for under any other Government contract, without the Contracting Officer's prior written approval.

(c) Supplies from stores stock.

(d) Publications and blank forms stocked by the installation.

(e) Safety and fire protection for Contractor personnel and facilities.

(f) Installation service facilities: Goddard Library

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(g) Medical treatment of a first-aid nature for Contractor personnel injuries or illnesses sustained during on-site duty.

(h) Cafeteria privileges for Contractor employees during normal operating hours.

(i) Building maintenance for facilities occupied by Contractor personnel.

(j) Moving and hauling for office moves, movement of large equipment, and delivery of supplies. Moving services shall be provided on-site, as approved by the Contracting Officer.

(k) The user responsibilities of the Contractor are defined in paragraph (a) of the clause at 1852.245-71, Installation-Accountable Government Property.

(End of clause)

G.15 ACCOUNTABILITY OF COSTS/SEGREGATION OF TASK ORDERS

(a) All costs incurred by the Contractor, under this contract, shall be segregated by each Task Order (TO). The Contractor shall therefore establish separate "Job Order Accounts and Numbers" for each Task Order issued and shall record all incurred costs in the appropriate job order account assigned each Task Order.

(b) The Contractor shall submit invoice(s) reflecting the costs incurred and segregated by each Task Order.

(c) There shall be no co-mingling of or transferring of costs between Task Orders.

(End of text)

[END OF SECTION]

**SECTION H OF CONTRACT NNG07CA22C
SPECIAL CONTRACT REQUIREMENTS**

H.1 SECTION H CLAUSES INCORPORATED BY REFERENCE

- (1852.208-81) RESTRICTIONS ON PRINTING AND DUPLICATING (NOV 2004)
- (1852.223-70) SAFETY AND HEALTH (APR 2002)
- (1852.223-75) MAJOR BREACH OF SAFETY OR SECURITY (FEB 2002)
- (1852.228-72) CROSS WAIVER OF LIABILITY FOR SPACE SHUTTLE SERVICES
(SEPT 1993)
- (1852.228-76) CROSS WAIVER OF LIABILITY FOR SPACE STATION ACTIVITIES
(DEC 1994)
- (1852.242-72) OBSERVANCE OF LEGAL HOLIDAYS (AUG 1992)--ALTERNATE II
(OCT 2000)
- (1852.244-70) GEOGRAPHIC PARTICIPATION IN THE AEROSPACE PROGRAM
(APRIL 1985)

(End of By Reference Section)

**H.2 - CONTRACTOR PERSONNEL—IDENTIFICATION, ONSITE REPORTING, AND
CHECKOUT PROCEDURES (GSFC 52.204-99) (SEPT 2006)**

(a) In accordance with FAR 52.204-9, Personal Identity Verification (PIV) of Contractor Personnel, the Contractor SHALL FOLLOW Steps 1 through 6 described in Attachment I, Personal Identity Verification (PIV) Card Issuance Procedures, for each contract employee (prime and subcontractor) who will have physical access to a NASA-controlled facility (also referred to as "onsite"). The Contractor must apply for permanent NASA/GSFC PIV cards for those contract employees who will be employed by the Contractor onsite for at least six months. The GSFC Security Division will consider permanent PIV cards for other employees of the Contractor on a case by case basis, such as employees that are not resident onsite, but must frequently visit. In the future, upon written notice from the Contracting Officer, the Contractor shall proceed with Step 7 of Attachment I for PIV credentials for all onsite contract personnel with PIV cards. In addition, upon future written notice from the Contracting Officer, the Contractor shall follow Steps 1 through 7 in Attachment I for each offsite contract employee (prime and subcontractor) who require remote access to a NASA information system for contract performance.

(b) The Contractor shall notify the GSFC Security Division, Code 240, Attention: Locator and Information Tracking System (LISTS) Manager, and the Contracting Officer's Technical Representative (COTR) of the contractor's designated LIST representative within 15 calendar days after award of this contract. The GSFC maintained LISTS contains work and home location and contact information for personnel that have permanent NASA/GSFC PIV cards. The Contractor may contact the LISTS Manager, Tel 301-286-2306 for assistance regarding LISTS.

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(c) For each contract employee, the Contractor must complete and submit a GSFC Form 24-27, "LISTS Form. The form is available from GSFC Stores Stock or online via NASA and GSFC systems <<http://gdms.gsfc.nasa.gov/gdmsnew/home.jsp>>. The GSFC Form 24-27 must be signed by the COTR or the Contracting Officer. The COTR will resolve any housing or access issues, review the forms for accuracy and completeness, and return the signed forms to the Contractor. The Contractor shall forward the form(s) to the GSFC Security Division, Code 240, for subsequent data entry into the LISTS.

(d) The Contractor shall submit an annotated LISTS Report each month. The GSFC LISTS Manager will furnish a LISTS print-out to the Contractor no later than the end of each month. The Contractor shall annotate this provided report monthly to correct and update the information as follows:

- (1) Draw a line through the names of employees who are no longer employed by the contractor or that no longer work onsite under the contract, and;
- (2) Make handwritten changes to any other incorrect data.

The annotated LISTS Report shall be separately submitted to the GSFC Security Division, Code 240, Attention: LISTS Manager, and to the COTR by the 10th calendar day of the month.

(e) The Contractor shall ensure that all personnel who have NASA/GSFC issued PIV cards, keys or other property who leave its employment or that no longer work onsite, process out through the GSFC Security Division, Code 240. Employees must return all GSFC issued identification and any Government property no later than the last day of their employment. The Contractor shall establish appropriate procedures and controls to ensure this is accomplished. Failure to comply may result in the exercise of Government rights to limit and control access to Government premises, including denial of access and invalidation of NASA issued PIV cards and identification.

(End of clause)

H.3 - GOVERNMENT PREMISES—PHYSICAL ACCESS AND COMPLIANCE WITH PROCEDURES (GSFC 52.211-95) (SEPT 2006)

(a) (1) The Contractor must apply for permanent NASA/GSFC Personal Identity Verification (PIV) cards (badges) for those employees that will be employed by the Contractor and subcontractors and that will be resident for at least six months at GSFC or at locations controlled by GSFC, such as GSFC leased space. Other personnel may be issued a temporary badge. All personnel must conspicuously display

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the GSFC PIV card at, or above, the waistline. Refer to GSFC clause 52.204-99, "Contractor Personnel-Identification, Onsite Reporting, and Checkout Procedures" for permanent PIV card issuance procedures.

(2) Visits by foreign nationals are restricted and must be necessary for the performance of the contract and concurred with by the Contracting Officer or by the Contracting Officer's Technical Representative. Approval of such visits must be approved in advance in accordance with GPR 1600.1.

(3) Access to the GSFC may be changed or adjusted in response to threat conditions or special situations.

(b) While on Government premises, the Contractor shall comply with requirements governing the conduct of personnel and the operation of the facility. These requirements are set forth in NASA-wide or installation directives, procedures, handbooks and announcements. The following cover many of the requirements:

- (1) Coordinated Harassment/Discrimination Inquiry Guidelines
<<http://internal.gsfc.nasa.gov/directives/security.html>>
- (2) GMI 1152.9, Facilities Coordination Committee
- (3) GPR 1600.1, GSFC Security Manual
- (4) GPR 1700.1, Occupational Safety Program
- (5) GPR 1700.2, Chemical Hygiene Plan
- (6) GPR 1800.1, GSFC Smoking Guidelines
- (7) GPR 1800.2, Occupational Health Program
- (8) GPR 1860.1, Ionizing Radiation Protection
- (9) GPR 1860.2, Laser Radiation Protection
- (10) GPR 1860.3, Radio Frequency Radiation Safety
- (11) GPR 1860.4, Ultraviolet and High Intensity Light Radiation Protection
- (12) GPR 2570.1, Radio Frequency Equipment Licensing
- (13) GPD 8500.1, Environmental Program Management
- (14) GPR 8710.2, Emergency Preparedness Program for Greenbelt
- (15) GPD 8715.1, GSFC Safety Policy
- (16) GPR 8715.1, Processing of NASA Safety Reporting System (NSRS) Incident Reports

Copies of the current issuances may be obtained at <<http://gdms.gsfc.nasa.gov>> or from the Contracting Officer. The above list may be modified by the Contracting Officer to include additional issuances pertaining to the conduct of personnel and the operation of the facility.

(c) The Contractor may not use official Government mail (indicia or "eagle" mail). Contractors found in violation could be liable for a fine of \$300 per piece of indicia mail used. However, the Contractor

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is allowed to use internal GSFC mail to the extent necessary for purposes of the contract.

(End of clause)

H. 4 REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFEROR (GSFC 52.215-90) (NOV 1999)

In accordance with FAR 15.204-1(b), the completed and submitted "Representations, Certifications, and Other Statements of Offeror", are incorporated by reference in this resulting contract.

(End of clause)

H. 5 SAFETY AND HEALTH--ADDITIONAL REQUIREMENTS (GSFC 52.223-91) (NOV 2005)

(a) Other safety and health requirements. In addition to compliance with all Federal, state, and local laws as required by paragraph (b) of NFS clause 18-52.223-70, the Contractor shall comply with the following:

Quarterly health and safety report specifying incidents, disabling injuries, lost work days incident rate, days lost, property damage cost, manhours worked/month, and total employees. Template available at <http://safety1st.gsfc.nasa.gov> under Contractor Safety.

(b) Reporting. The immediate notification and prompt reporting required by paragraph (d) of NFS clause 1852.223-70 shall be to the to the Goddard Space Flight Center Safety and Environmental Branch, Code 250, Tel 301-286-2281 and to the Contracting Officer. This should be a verbal notification and confirmed by FAX or E-Mail. This notification is also required for any unsafe or environmentally hazardous condition associated with Government-owned property that is provided or made available for the performance of the contract.

(End of clause)

H. 6 LIMITATION OF FUTURE CONTRACTING (1852.209-71) (DEC 1988)

(a) The Contracting Officer has determined that this acquisition may give rise to a potential organizational conflict of interest. Accordingly, the attention of prospective offerors is invited to FAR Subpart 9.5-Organizational Conflicts of Interest.

(b) The nature of this conflict, in general terms, is that:

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1. The contractor may be tasked to develop statements of work and/or specifications, which may be used in subsequent, competitive acquisitions, and
2. The contractor may require access to other NASA contractor data, and
3. The contractor may be tasked to develop and/or maintain NASA program/project financial systems.

(c) The restrictions upon future contracting are as follows:

(1) If the Contractor, under the terms of this contract, or through the performance of tasks pursuant to this contract, is required to develop specifications or statements of work and such specifications or statements of work are to be incorporated into a solicitation, the Contractor shall be ineligible to perform the work described in that solicitation as a prime or first-tier subcontractor under an ensuing NASA contract. This restriction shall remain in effect for a reasonable time as agreed to by the Contracting Officer and the Contractor sufficient to avoid unfair competitive advantage or potential bias (this time shall in no case be less than the duration of the initial production contract). NASA shall not unilaterally require the Contractor to prepare such specifications or statements of work under this contract.

(2) To the extent that the work under this contract requires access to proprietary, business confidential, or financial data of other companies, and as long as these data remain proprietary or confidential, the Contractor shall protect these data from unauthorized use and disclosure and agrees not use them to compete with those other companies.

(End of clause)

H. 7 TASK ORDERING PROCEDURE (1852.216-80) (OCTOBER 1996)

(a) Only the Contracting Officer may issue task orders to the Contractor, providing specific authorization or direction to perform work within the scope of the contract and as specified in the schedule. The Contractor may incur costs under this contract in performance of task orders and task order modifications issued in accordance with this clause. No other costs are authorized unless otherwise specified in the contract or expressly authorized by the Contracting Officer.

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

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(1) A functional description of the work identifying the objectives or results desired from the contemplated task order.

(2) Proposed performance standards to be used as criteria for determining whether the work requirements have been met.

(3) A request for a task plan from the Contractor to include the technical approach, period of performance, appropriate cost information, and any other information required to determine the reasonableness of the Contractor's proposal.

(c) Within **14** calendar days after receipt of the Contracting Officer's request; however, less time may be specified on individual tasks. The Contractor shall submit a task plan conforming to the request.

(d) After review and any necessary discussions, the Contracting Officer may issue a task order to the Contractor containing, as a minimum, the following:

(1) Date of the order.

(2) Contract number and order number.

(3) Functional description of the work identifying the objectives or results desired from the task order, including special instructions or other information necessary for performance of the task.

(4) Performance standards, and where appropriate, quality assurance standards.

(5) Maximum dollar amount authorized (cost and fee or price). This includes allocation of award fee among award fee periods, if applicable.

(6) Any other resources (travel, materials, equipment, facilities, etc.) authorized.

(7) Delivery/performance schedule including start and end dates.

(8) If contract funding is by individual task order, accounting and appropriation data.

(e) The Contractor shall provide acknowledgment of receipt to the Contracting Officer within **5** calendar days after receipt of the task order.

(f) If time constraints do not permit issuance of a fully defined task order in accordance with the procedures described in paragraphs (a) through (d), a task order which includes a ceiling price may be issued.

(g) The Contracting Officer may amend tasks in the same manner in which they were issued.

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(h) In the event of a conflict between the requirements of the task order and the Contractor's approved task plan, the task order shall prevail.

(End of clause)

H. 8 EXPORT LICENSES (1852.225-70) (FEB 2000)

(a) The Contractor shall comply 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 contract. In the absence of available license exemptions/exceptions, the Contractor shall 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) The Contractor shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of this contract, including instances where the work is to be performed on-site at any Government installation, where the foreign person will have access to export-controlled technical data or software.

(c) The Contractor shall be responsible for all regulatory record keeping requirements associated with the use of licenses and license exemptions/exceptions.

(d) The Contractor shall be responsible for ensuring that the provisions of this clause apply to its subcontractors.

(End of clause)

H. 9 ACCESS TO SENSITIVE INFORMATION (1852.237-72) (JUNE 2005)

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

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

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

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

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

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

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

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

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

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

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

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

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

(End of clause)

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H.10 RELEASE OF SENSITIVE INFORMATION (1852.237-73) (JUNE 2005)

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

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

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

Mark the title page with the following legend:

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

Mark each page of sensitive information the Contractor wishes to restrict with the following legend:

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

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

(d) To receive access to sensitive information needed to assist NASA in accomplishing management activities and administrative functions, the service provider must be operating under a contract that contains the clause at 1852.237-72, Access to Sensitive Information. This clause obligates the service provider to do the following:

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

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

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

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

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

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

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

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

(e) When the service provider will have primary responsibility for operating an information technology system for NASA that contains sensitive information, the service provider's contract shall include the clause at 1852.204-76, Security Requirements for Unclassified Information Technology Resources. The Security Requirements clause requires the service provider to implement an Information Technology

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Security Plan to protect information processed, stored, or transmitted from unauthorized access, alteration, disclosure, or use. Service provider personnel requiring privileged access or limited privileged access to these information technology systems are subject to screening using the standard National Agency Check (NAC) forms appropriate to the level of risk for adverse impact to NASA missions. The Contracting Officer may allow the service provider to conduct its own screening, provided the service provider employs substantially equivalent screening procedures.

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

(g) The Contractor shall insert this clause, including this paragraph (g), suitably modified to reflect the relationship of the parties, in all subcontracts that may require the furnishing of sensitive information.

(End of clause)

H. 11 NON-PERSONAL SERVICES

(a) No personal services shall be performed under this contract. No Contractor employee will be directly supervised by the Government. All individual employee assignments, and daily work direction, shall be given by the applicable employee supervisor. If the Contractor believes any Government action or communication has been given that would create a personal services relationship between the Government and any Contractor employee, the Contractor shall promptly notify the Contracting Officer of this communication or action.

(b) The Contractor shall not perform any inherently governmental actions under this contract. No contractor employees shall hold him or herself out to be a Government employee, agent, or representative. No contractor employee shall state orally, or in writing at any time that he or she is acting on behalf of the government. In all communications with third parties in connection with this contract, contractor employees shall identify themselves as Contractor employees and specify the name of the company for which they work. In all communications with other government contractors in connection with this contract, the Contractor employee shall state that they have no authority to in any way change the contract.

(c) The Contractor shall insure that all of its employees working on this contract are informed of the substance of this clause. Nothing in this clause shall limit the Government's rights in any way under other provisions of the contract, including those related to the

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Government's right to inspect and accept services to be performed under this contract. The substance of this text shall be included in all subcontracts at any tier.

(End of text)

H. 12 TRAVEL, SUBSISTENCE, CONUS AND OCONUS PRICING

The Government will reimburse travel required in the performance of this contract, identified by individual task orders. Travel will be in accordance with the Federal Travel Regulations (FTR) and the NASA Supplemental Travel Regulations, as applicable. Established Federal Government Per Diem rates will apply to contractor travel. The Contractor shall provide a detailed description in the monthly report of all anticipated and/or completed travel in response to each task order.

(End of text)

[END OF SECTION]

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I.1 SECTION I CLAUSES INCORPORATED BY REFERENCE

- (52.202-1) DEFINITIONS (JUL 2004)
- (52.203-3) GRATUITIES (APR 1984)
- (52.203-5) COVENANT AGAINST CONTINGENT FEES (APR 1984)
- (52.203-6) RESTRICTIONS ON SUBCONTRACTOR SALES TO THE GOVERNMENT (SEPT 2006)
- (52.203-7) ANTI-KICKBACK PROCEDURES (JUL 1995)
- (52.203-8) CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)
- (52.203-10) PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)
- (52.203-12) LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (SEPT 2005)
- (52.204-2) SECURITY REQUIREMENTS (AUG 1996)
- (52.204-4) PRINTED OR COPIED DOUBLE-SIDED ON RECYCLED PAPER (AUG 2000)
- (52.204-7) CENTRAL CONTRACTOR REGRISTRATION (OCT 2003)
- (52.204-9) PERSONAL IDENTITY VERIFICATION OF CONTRACTOR PERSONNEL (SEPT 2006)
- (52.209-6) PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT (SEPT 2006)
- (52.211-5) MATERIAL REQUIREMENTS (AUG 2000)
- (52.211-15) DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS (SEPT 1990)
- (52.215-2) AUDIT AND RECORDS--NEGOTIATION (JUNE 1999)
- (52.215-8) ORDER OF PRECEDENCE--UNIFORM CONTRACT FORMAT (OCT 1997)
- (52.215-11) PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA--MODIFICATION (OCT 1997)
- (52.215-13) SUBCONTRACTOR COST OR PRICING DATA--MODIFICATIONS (OCT 1997)
- (52.215-14) INTEGRITY OF UNIT PRICES (OCT 1997)
- (52.215-15) PENSION ADJUSTMENTS AND ASSET REVERSIONS (OCT 2004)
- (52.215-18) REVERSION OR ADJUSTMENT OF PLANS FOR POSTRETIREMENT BENEFITS (PRB) OTHER THAN PENSIONS (JUL 2005)
- (52.215-19) NOTIFICATION OF OWNERSHIP CHANGES (OCT 1997)
- (52.215-21) REQUIREMENTS FOR COST OR PRICING DATA OR INFORMATION OTHER THAN COST OR PRICING DATA--MODIFICATIONS (OCT 1997)
- (52.216-7) ALLOWABLE COST AND PAYMENT (DEC 2002)
- (52.219-6) NOTICE OF TOTAL SMALL BUSINESS SET-ASIDE (JUNE 2003)
- (52.219-8) UTILIZATION OF SMALL BUSINESS CONCERNS (MAY 2004)
- (52.222-1) NOTICE TO THE GOVERNMENT OF LABOR DISPUTES (FEB 1997)
- (52.222-19) CHILD LABOR--COOPERATION WITH AUTHORITIES AND REMEDIES (JAN 2006)

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- (52.222-20) WALSH-HEALEY PUBLIC CONTRACTS ACT (DEC 1996)
- (52.222-21) PROHIBITION OF SEGREGATED FACILITIES (FEB 1999)
- (52.222-26) EQUAL OPPORTUNITY (APR 2002)
- (52.222-35) EQUAL OPPORTUNITY FOR SPECIAL DISABLED VETERANS,
VETERANS OF THE VIETNAM ERA, AND OTHER ELIGIBLE
VETERANS (SEPT 2006)
- (52.222-36) AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES
(JUN 1998)
- (52.222-37) EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS,
VETERANS OF THE VIETNAM ERA, AND OTHER ELIGIBLE
VETERANS (SEPT 2006)
- (52.222-50) COMBATING TRAFFICKING IN PERSONS (APR 2006)
- (52.223-5) POLLUTION PREVENTION AND RIGHT-TO-KNOW INFORMATION
(AUG 2003)
- (52.223-6) DRUG FREE WORK PLACE (MAY 2001)
- (52.223-14) TOXIC CHEMICAL RELEASE REPORTING (AUG 2003)
- (52.225-1) BUY AMERICAN ACT--SUPPLIES (JUNE 2003)
- (52.225-8) DUTY FREE ENTRY (FEB 2000)
- (52.225-13) RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (FEB 2006)
- (52.227-1) AUTHORIZATION AND CONSENT (JUL 1995)--ALTERNATE I
(APR 1984)
- (52.227-2) NOTICE AND ASSISTANCE REGARDING PATENT AND COPY-RIGHT
INFRINGEMENT (AUG 1996)
- (52.227-11) PATENT RIGHTS--RETENTION BY CONTRACTOR (SHORT FORM)
(JUN 1997) as modified by NASA FAR Supplement
1852.227-11
- (52.227-14) RIGHTS IN DATA--GENERAL (JUN 1987) as modified by NASA
FAR Supplement 1852.227-14
- (52.228-7) INSURANCE--LIABILITY TO THIRD PERSONS (MAR 1996)
- (52.232-17) INTEREST (JUN 1996)
- (52.232-22) LIMITATION OF FUNDS (APR 1984)
- (52.232-23) ASSIGNMENT OF CLAIMS (JAN 1986)
- (52.232-25) PROMPT PAYMENT (OCT 2003)--ALTERNATE I (FEB 2002)
- (52.232-34) PAYMENT BY ELECTRONIC FUNDS TRANSFER--OTHER THAN
CENTRAL CONTRACTOR REGISTRATION (MAY 1999) [para (b) (1)
fill-in hereafter: "designated office"--Cost and
Commercial Accounts Department, Code 155, NASA/Goddard
Space Flight Center, Greenbelt, MD 20771, FAX 301-286-
1748, no later than concurrent with the first request
for payment.]
- (52.233-1) DISPUTES (JULY 2002)
- (52.233-3) PROTEST AFTER AWARD (AUG 1996)--ALTERNATE I (JUN 1985)
- (52.233-4) APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM (OCT 2004)
- (52.237-2) PROTECTION OF GOVERNMENT BUILDINGS, EQUIPMENT, AND
VEGETATION (APR 1984)
- (52.237-3) CONTINUITY OF SERVICES (JAN 1991)
- (52.239-1) PRIVACY OR SECURITY SAFEGUARDS (AUG 1996)
- (52.242-1) NOTICE OF INTENT TO DISALLOW COSTS (APR 1984)

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- (52.242-3) PENALTIES FOR UNALLOWABLE COSTS (MAY 2001)
- (52.242-4) CERTIFICATION OF FINAL INDIRECT COSTS (JAN 1997)
- (52.242-13) BANKRUPTCY (JUL 1995)
- (52.243-2) CHANGES--COST-REIMBURSEMENT (AUG 1987)-- ALTERNATE II (APR 1984)
- (52.244-2) SUBCONTRACTS (AUG 1998) [paragraph (e) is "Professional and consultant Services as defined at FAR 31.205-33" and paragraph (k) is "Orbital Sciences Corporation and Millennium Engineering and Integration Company"]
- (52.244-5) COMPETITION IN SUBCONTRACTING (DEC 1996)
- (52.245-1) PROPERTY RECORDS (APR 1984)
- (52.245-5) GOVERNMENT PROPERTY (COST-REIMBURSEMENT, TIME-AND-MATERIAL, OR LABOR-HOUR CONTRACTS) (MAY 2004) (DEVIATION) (SEP 1999)--(g) (5) of the clause shall read as follows: "The contractor shall notify the contracting officer upon loss or destruction of, or damage to, Government property provided under this contract, with the exception of low value property for which loss, damage, or destruction is reported at contract termination, completion, or when needed for continued performance. The Contractor shall take all reasonable action to protect the Government property from further damage, separate the damaged and undamaged Government property, put all the affected Government property in the best possible order, and furnish to the Contracting Officer a statement of--" the balance of (g) (5) is unchanged.
- (52.245-19) GOVERNMENT PROPERTY FURNISHED "AS IS" (APR 1984)
- (52.246-24) LIMITATION OF LIABILITY-HIGH-VALUE ITEMS (Feb 1997)
- (52.246-25) LIMITATION OF LIABILITY--SERVICES (FEB 1997)
- (52.247-1) COMMERCIAL BILL OF LADING NOTATIONS (FEB 2006)
- (52.247-63) PREFERENCE FOR U.S.-FLAG AIR CARRIERS (JUNE 2003)
- (52.247-67) SUBMISSION OF COMMERCIAL TRANSPORTATION BILLS TO THE GENERAL SERVICES ADMINISTRATION FOR AUDIT (FEB 2006)
- (52.249-6) TERMINATION (COST-REIMBURSEMENT) (MAY 2004)
- (52.249-14) EXCUSABLE DELAYS (APR 1984)
- (52.251-1) GOVERNMENT SUPPLY SOURCES (APR 1984)
- (1852.203-70) DISPLAY OF INSPECTOR GENERAL HOTLINE POSTERS (JUNE 2001)
- (1852.204-76) SECURITY REQUIREMENTS FOR UNCLASSIFIED INFORMATION TECHNOLOGY RESOURCES (NOV 2004) (DEVIATION) Para (c) Within "30 days"
- (1852.215-84) OMBUDSMAN (OCT 2003)--ALTERNATE I (JUNE 2000) The installation Ombudsman is Dorothy C. Perkins, Goddard Space Flight Center, Mailstop 100, Greenbelt, MD 20771, Business Phone: 301 286-5066, Fax 301 286-1714, E-mail address: Dorothy.C.Perkins@nasa.gov

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- (1852.216-89) ASSIGNMENT AND RELEASE FORMS (JUL 1997)
- (1852.223-74) DRUG-AND ALCOHOL-FREE WORKPLACE (MAR 1996)
- (1852.242-78) EMERGENCY MEDICAL SERVICES AND EVACUATION (APR 2001)
- (1852.243-71) SHARED SAVINGS (MAR 1997)

(End of By Reference Section)

I.2 LIMITATIONS ON SUBCONTRACTING (52.219-14) (DEC 1996)

(a) This clause does not apply to the unrestricted portion of a partial set-aside.

(b) By submission of an offer and execution of a contract, the Offeror/Contractor agrees that in performance of the contract in the case of a contract for--

(1) Services (except construction). At least 50 percent of the cost of contract performance incurred for personnel shall be expended for employees for the concern.

(2) Supplies (other than procurement from a nonmanufacturer of such supplies). The concern shall perform work for at least 50 percent of the cost of manufacturing the supplies, not including the cost of materials.

(3) General construction. The concern will perform at least 15 percent of the cost of the contract, not including the cost of materials, with its own employees.

(4) Construction by special trade contractors. The concern will perform at least 25 percent of the cost of the contract, not including the cost of materials, with its own employees.

(End of clause)

I.3 NOTIFICATION OF EMPLOYEE RIGHTS CONCERNING PAYMENT OF UNION DUES OR FEES (52.222-39) (DEC 2004)

(a) Definition. As used in this clause--

"United States" means the 50 States, the District of Columbia, Puerto Rico, the Northern Mariana Islands, American Samoa, Guam, the U.S. Virgin Islands, and Wake Island.

(b) Except as provided in paragraph (e) of this clause, during the term of this contract, the Contractor shall post a notice, in the form

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of a poster, informing employees of their rights concerning union membership and payment of union dues and fees, in conspicuous places in and about all its plants and offices, including all places where notices to employees are customarily posted. The notice shall include the following information (except that the information pertaining to National Labor Relations Board shall not be included in notices posted in the plants or offices of carriers subject to the Railway Labor Act, as amended (45 U.S.C. 151-188)).

Notice to Employees

Under Federal law, employees cannot be required to join a union or maintain membership in a union in order to retain their jobs. Under certain conditions, the law permits a union and an employer to enter into a union-security agreement requiring employees to pay uniform periodic dues and initiation fees. However, employees who are not union members can object to the use of their payments for certain purposes and can only be required to pay their share of union costs relating to collective bargaining, contract administration, and grievance adjustment.

If you do not want to pay that portion of dues or fees used to support activities not related to collective bargaining, contract administration, or grievance adjustment, you are entitled to an appropriate reduction in your payment. If you believe that you have been required to pay dues or fees used in part to support activities not related to collective bargaining, contract administration, or grievance adjustment, you may be entitled to a refund and to an appropriate reduction in future payments.

For further information concerning your rights, you may wish to contact the National Labor Relations Board (NLRB) either at one of its Regional offices or at the following address or toll free number:

National Labor Relations Board
Division of Information
1099 14th Street, N.W.
Washington, DC 20570
1-866-667-6572
1-866-316-6572 (TTY)

To locate the nearest NLRB office, see NLRB's website at <http://www.nlr.gov>.

END OF NOTICE

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(c) The Contractor shall comply with all provisions of Executive Order 13201 of February 17, 2001, and related implementing regulations at 29 CFR Part 470, and orders of the Secretary of Labor.

(d) In the event that the Contractor does not comply with any of the requirements set forth in paragraphs (b), (c), or (g), the Secretary may direct that this contract be cancelled, terminated, or suspended in whole or in part, and declare the Contractor ineligible for further Government contracts in accordance with procedures at 29 CFR Part 470, Subpart B-Compliance Evaluations, Complaint Investigations and Enforcement Procedures. Such other sanctions or remedies may be imposed as are provided by 29 CFR Part 470, which implements Executive Order 13201, or as are otherwise provided by law.

(e) The requirement to post the employee notice in paragraph (b) does not apply to-

(1) Contractors and subcontractors that employ fewer than 15 persons;

(2) Contractor establishments or construction work sites where no union has been formally recognized by the Contractor or certified as the exclusive bargaining representative of the Contractor's employees;

(3) Contractor establishments or construction work sites located in a jurisdiction named in the definition of the United States in which the law of that jurisdiction forbids enforcement of union-security agreements;

(4) Contractor facilities where upon the written request of the Contractor, the Department of Labor Deputy Assistant Secretary for Labor-Management Programs has waived the posting requirements with respect to any of the Contractor's facilities if the Deputy Assistant Secretary finds that the Contractor has demonstrated that-

(i) The facility is in all respects separate and distinct from activities of the Contractor related to the performance of a contract; and

(ii) Such a waiver will not interfere with or impede the effectuation of the Executive order; or

(5) Work outside the United States that does not involve the recruitment or employment of workers within the United States.

(f) The Department of Labor publishes the official employee notice in two variations; one for contractors covered by the Railway Labor Act and a second for all other contractors. The Contractor shall-

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(1) Obtain the required employee notice poster from the Division of Interpretations and Standards, Office of Labor-Management Standards, U.S. Department of Labor, 200 Constitution Avenue, NW, Room N-5605, Washington, DC 20210, or from any field office of the Department's Office of Labor-Management Standards or Office of Federal Contract Compliance Programs;

(2) Download a copy of the poster from the Office of Labor-Management Standards website at <http://www.olms.dol.gov>; or

(3) Reproduce and use exact duplicate copies of the Department of Labor's official poster.

(g) The Contractor shall include the substance of this clause in every subcontract or purchase order that exceeds the simplified acquisition threshold, entered into in connection with this contract, unless exempted by the Department of Labor Deputy Assistant Secretary for Labor-Management Programs on account of special circumstances in the national interest under authority of 29 CFR 470.3(c). For indefinite quantity subcontracts, the Contractor shall include the substance of this clause if the value of orders in any calendar year of the subcontract is expected to exceed the simplified acquisition threshold. Pursuant to 29 CFR Part 470, Subpart B-Compliance Evaluations, Complaint Investigations and Enforcement Procedures, the Secretary of Labor may direct the Contractor to take such action in the enforcement of these regulations, including the imposition of sanctions for noncompliance with respect to any such subcontract or purchase order. If the Contractor becomes involved in litigation with a subcontractor or vendor, or is threatened with such involvement, as a result of such direction, the Contractor may request the United States, through the Secretary of Labor, to enter into such litigation to protect the interests of the United States.

(End of clause)

**I. 4 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA
(52.223-3) (JAN 1997)--ALTERNATE I (JUL 1995)**

(a) "Hazardous material," as used in this clause, includes any material defined as hazardous under the latest version of Federal Standard No. 313 (including revisions adopted during the term of the contract).

(b) The offeror must list any hazardous material, as defined by paragraph (a) of this clause, to be delivered under this contract. The hazardous material shall be properly identified and include any

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(1) To use, duplicate, and disclose any data to which this clause is applicable. The purposes of this right are to--

(i) Apprise personnel of the hazards to which they may be exposed in using, handling, packaging, transporting, or disposing of hazardous materials;

(ii) Obtain medical treatment for those affected by the material; and

(iii) Have others use, duplicate, and disclose the data for the Government for these purposes.

(2) To use, duplicate, and disclose data furnished under this clause, in accordance with subparagraph (h)(1) of this clause, in precedence over any other clause of this contract providing for rights in data.

(3) The Government is not precluded from using similar or identical data acquired from other sources.

(i) Except as provided in paragraph (i)(2), the Contractor shall prepare and submit a sufficient number of Material Safety Data Sheets (MSDS's), meeting the requirements of 29 CFR 1910.1200(g) and the latest version of Federal Standard No. 313, for all hazardous material identified in paragraph (b) of this clause.

(1) For items shipped to consignees, the Contractor shall include a copy of the MSDS's with the packing list or other suitable shipping document which accompanies each shipment. Alternatively, the Contractor is permitted to transmit MSDS's to consignees in advance of receipt of shipments by consignees, if authorized by the Contracting Officer.

(2) For items shipped to consignees identified by mailing address as agency depots, distribution centers or customer supply centers, the Contractor shall provide one copy of the MSDS's in or on each shipping container. If affixed to the outside of each container, the MSDS must be placed in a weather resistant envelope.

(End of clause)

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I.5 NOTICE OF RADIOACTIVE MATERIALS (52.223-7) (JAN 1997)

(a) The Contractor shall notify the Contracting Officer or designee, in writing, thirty (30) days prior to the delivery of, or prior to the completion of any servicing required by this contract, of items containing either (1) radioactive material requiring specific licensing under the regulations issued pursuant to the Atomic Energy Act of 1954, as amended, as set forth in title 10 of the Code of Federal Regulations, in effect on the date of this contract, or (2) other radioactive material not requiring specific licensing in which the specific activity is greater than 0.002 microcuries per gram or the activity per item equals or exceeds 0.01 microcuries. Such notice shall specify the part or parts of the items which contain radioactive materials, a description of the materials, the name and activity of the isotope, the manufacturer of the materials, and any other information known to the Contractor which will put users of the items on notice as to the hazards involved (OMB No. 9000-0107).

(b) If there has been no change affecting the quantity of activity, or the characteristics and composition of the radioactive material from deliveries under this contract or prior contracts, the Contractor may request that the Contracting Officer or designee waive the notice requirement in paragraph (a) of this clause. Any such request shall--

(1) Be submitted in writing;

(2) State that the quantity of activity, characteristics, and composition of the radioactive material have not changed; and

(3) Cite the contract number on which the prior notification was submitted and the contracting office to which it was submitted.

(c) All items, parts, or subassemblies which contain radioactive materials in which the specific activity is greater than 0.002 microcuries per gram or activity per item equals or exceeds 0.01 microcuries, and all containers in which such items, parts or subassemblies are delivered to the Government shall be clearly marked and labeled as required by the latest revision of MIL-STD 129 in effect on the date of the contract.

(d) This clause, including this paragraph (d), shall be inserted in all subcontracts for radioactive materials meeting the criteria in paragraph (a) of this clause.

(End of clause)

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I. 6 LIMITATION ON WITHHOLDING OF PAYMENTS (52.232-9) (APR 1984)

If more than one clause or Schedule term of this contract authorizes the temporary withholding of amounts otherwise payable to the Contractor for supplies delivered or services performed, the total of the amounts withheld at any one time shall not exceed the greatest amount that may be withheld under any one clause or Schedule term at that time; provided, that this limitation shall not apply to--

(a) Withholdings pursuant to any clause relating to wages or hours of employees;

(b) Withholdings not specifically provided for by this contract;

(c) The recovery of overpayments; and

(d) Any other withholding for which the Contracting Officer determines that this limitation is inappropriate.

(End of clause)

I. 7 NOTIFICATION OF CHANGES (52.243-7) (APR 1984)

(a) Definitions. "Contracting Officer," as used in this clause, does not include any representative of the Contracting Officer. "Specifically authorized representative (SAR)," as used in this clause, means any person the Contracting Officer has so designated by written notice (a copy of which shall be provided to the Contractor) which shall refer to this subparagraph and shall be issued to the designated representative before the SAR exercises such authority.

(b) Notice. The primary purpose of this clause is to obtain prompt reporting of Government conduct that the Contractor considers to constitute a change to this contract. Except for changes identified as such in writing and signed by the Contracting Officer, the Contractor shall notify the Administrative Contracting Officer in writing promptly, within **seven** calendar days from the date that the Contractor identifies any Government conduct (including actions, inactions, and written or oral communications) that the Contractor regards as a change to the contract terms and conditions. On the basis of the most accurate information available to the Contractor, the notice shall state--

(1) The date, nature, and circumstances of the conduct regarded as a change;

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(2) The name, function, and activity of each Government individual and Contractor official or employee involved in or knowledgeable about such conduct;

(3) The identification of any documents and the substance of any oral communication involved in such conduct;

(4) In the instance of alleged acceleration of scheduled performance or delivery, the basis upon which it arose;

(5) The particular elements of contract performance for which the Contractor may seek an equitable adjustment under this clause, including--

(i) What contract line items have been or may be affected by the alleged change,

(ii) What labor or materials or both have been or may be added, deleted, or wasted by the alleged change;

(iii) To the extent practicable, what delay and disruption in the manner and sequence of performance and effect on continued performance have been or may be caused by the alleged change;

(iv) What adjustments to contract price, delivery schedule, and other provisions affected by the alleged change are estimated; and

(6) The Contractor's estimate of the time by which the Government must respond to the Contractor's notice to minimize cost, delay or disruption of performance.

(c) Continued performance. Following submission of the notice required by (b) above, the Contractor shall diligently continue performance of this contract to the maximum extent possible in accordance with its terms and conditions as construed by the Contractor, unless the notice reports a direction of the Contracting Officer or a communication from a SAR of the Contracting Officer, in either of which events the Contractor shall continue performance; provided, however, that if the Contractor regards the direction or communication as a change as described in (b) above, notice shall be given in the manner provided. All directions, communications, interpretations, orders and similar actions of the SAR shall be reduced to writing promptly and copies furnished to the Contractor and to the Contracting Officer. The Contracting Officer shall promptly countermand any action which exceeds the authority of the SAR.

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(d) Government response. The Contracting Officer shall promptly, within **21** calendar days after receipt of notice, respond to the notice in writing. In responding, the Contracting Officer shall either--

(1) Confirm that the conduct of which the Contractor gave notice constitutes a change and when necessary direct the mode of further performance;

(2) Countermand any communication regarded as a change;

(3) Deny that the conduct of which the Contractor gave notice constitutes a change and when necessary direct the mode of further performance; or

(4) In the event the Contractor's notice information is inadequate to make a decision under (1), (2), or (3) above, advise the Contractor what additional information is required, and establish the date by which it should be furnished and the date thereafter by which the Government will respond.

(e) Equitable adjustments. (1) If the Contracting Officer confirms that Government conduct effected a change as alleged by the Contractor, and the conduct causes an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the work under this contract, whether changed or not changed by such conduct, an equitable adjustment shall be made--

(i) In the contract price or delivery schedule or both; and

(ii) In such other provisions of the contract as may be affected.

(2) The contract shall be modified in writing accordingly. In the case of drawings, designs or specifications which are defective and for which the Government is responsible, the equitable adjustment shall include the cost and time extension for delay reasonably incurred by the Contractor in attempting to comply with the defective drawings, designs or specifications before the Contractor identified, or reasonably should have identified, such defect. When the cost of property made obsolete or excess as a result of a change confirmed by the Contracting Officer under this clause is included in the equitable adjustment, the Contracting Officer shall have the right to prescribe the manner of disposition of the property. The equitable adjustment shall not include increased costs or time extensions for delay resulting from the Contractor's failure to provide notice or to continue performance as provided, respectively, in (b) and (c) above.

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NOTE: The phrases "contract price" and "cost" wherever they appear in the clause, may be appropriately modified to apply to cost-reimbursement or incentive contracts, or to combinations thereof.

(End of clause)

I. 8 SUBCONTRACTS FOR COMMERCIAL ITEMS (52.244-6) (SEPT 2006)

(a) *Definitions.* As used in this clause—

"Commercial item" has the meaning contained in Federal Acquisition Regulation 2.101, Definitions.

"Subcontract" includes a transfer of commercial items between divisions, subsidiaries, or affiliates of the Contractor or subcontractor at any tier.

(b) To the maximum extent practicable, the Contractor shall incorporate, and require its subcontractors at all tiers to incorporate, commercial items or nondevelopmental items as components of items to be supplied under this contract.

(c) (1) The Contractor shall insert the following clauses in subcontracts for commercial items:

(i) 52.219-8, Utilization of Small Business Concerns (May 2004) (15 U.S.C. 637(d)(2) and (3)), in all subcontracts that offer further subcontracting opportunities. If the subcontract (except subcontracts to small business concerns) exceeds \$500,000 (\$1,000,000 for construction of any public facility), the subcontractor must include 52.219-8 in lower tier subcontracts that offer subcontracting opportunities.

(ii) 52.222-26, Equal Opportunity (Apr 2002) (E.O. 11246).

(iii) 52.222-35, Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (Sept 2006) (38 U.S.C. 4212(a));

(iv) 52.222-36, Affirmative Action for Workers with Disabilities (June 1998) (29 U.S.C. 793).

(v) 52.222-39, Notification of Employee Rights Concerning Payment of Union Dues or Fees (Dec 2004) (E.O. 13201). Flow down as required in accordance with paragraph (g) of FAR clause 52.222-39).

(vi) 52.247-64, Preference for Privately Owned U.S.-Flag Commercial Vessels (Feb 2006) (46 U.S.C. App. 1241 and 10 U.S.C. 2631) (flow down required in accordance with paragraph (d) of FAR clause 52.247-64).

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(2) While not required, the Contractor may flow down to subcontracts for commercial items a minimal number of additional clauses necessary to satisfy its contractual obligations.

(d) The Contractor shall include the terms of this clause, including this paragraph (d), in subcontracts awarded under this contract.

(End of clause)

I.9 CLAUSES INCORPORATED BY REFERENCE (52.252-2) (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

Federal Acquisition Regulation (FAR) clauses:

<http://www.arnet.gov/far/>

NASA FAR Supplement (NFS) clauses:

<http://www.hq.nasa.gov/office/procurement/regs/nfstoc.htm>

(End of clause)

I.10 COMPUTER GENERATED FORMS (52.253-1) (JAN 1991)

(a) Any data required to be submitted on a Standard or Optional Form prescribed by the Federal Acquisition Regulation (FAR) may be submitted on a computer generated version of the form, provided there is no change to the name, content, or sequence of the data elements on the form, and provided the form carries the Standard or Optional Form number and edition date.

(b) Unless prohibited by agency regulations, any data required to be submitted on an agency unique form prescribed by an agency supplement to the FAR may be submitted on a computer generated version of the form provided there is no change to the name, content, or sequence of the data elements on the form and provided the form carries the agency form number and edition date.

(c) If the Contractor submits a computer generated version of a form that is different than the required form, then the rights and

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obligations of the parties will be determined based on the content of the required form.

(End of clause)

I. 11 SECURITY CLASSIFICATION REQUIREMENTS (1852.204-75) (SEPT 1989)

Performance under this contract will involve access to and/or generation of classified information, work in a security area, or both, up to the level of secret. See Federal Acquisition Regulation clause 52.204-2 in this contract and DD Form 254, Contract Security Classification Specification, Attachment D.

(End of clause)

I. 12 USE OF RURAL AREA SMALL BUSINESSES (1852.219-74) (SEP 1990)

(a) Definitions.

"Rural area" means any county with a population of fewer than twenty thousand individuals.

"Small business concern," as used in this clause, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding under this contract, and qualified as a small business under the criteria and size standards in 13 CFR 121.

(b) NASA prime and subcontractors are encouraged to use their best efforts to award subcontracts to small business concerns located in rural areas.

(c) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as small business concerns located in rural areas.

(d) The Contractor agrees to insert the provisions of this clause, including this paragraph (d), in all subcontracts hereunder that offer subcontracting possibilities.

(End of clause)

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I. 13 NASA 8 PERCENT GOAL (1852.219-76) (JUL 1997)

(a) Definitions.

"Historically Black Colleges or University", as used in this clause means an institution determined by the Secretary of Education to meet the requirements of 34 CFR Section 608.2. The term also includes any nonprofit research institution that was an integral part of such a college or university before November 14, 1986.

"Minority institutions", as used in this clause, means an institution of higher education meeting the requirements of section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1135d-5(3)) which for the purposes of this clause includes a Hispanic-serving institution of higher education as defined in section 316(b)(1) of the Act (20 U.S.C. 1059c(b)(1)).

"Small disadvantaged business concern", as used in this clause, means a small business concern that (1) is at least 51 percent unconditionally owned by one or more individuals who are both socially and economically disadvantaged, or a publicly owned business having at least 51 percent of its stock unconditionally owned by one or more socially and economically disadvantaged individuals, and (2) has its management and daily business controlled by one or more such individuals. This term also means a small business concern that is at least 51 percent unconditionally owned by an economically disadvantaged Indian tribe or Native Hawaiian Organization, or a publicly owned business having at least 51 percent of its stock unconditionally owned by one or more of these entities, which has its management and daily business controlled by members of an economically disadvantaged Indian tribe or Native Hawaiian Organization, and which meets the requirements of 13 CFR 124.

"Women-owned small business concern", as used in this clause, means a small business concern (1) which is at least 51 percent owned by one or more women or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women, and (2) whose management and daily business operations are controlled by one or more women.

(b) The NASA Administrator is required by statute to establish annually a goal to make available to small disadvantaged business concerns, Historically Black Colleges and Universities, minority institutions, and women-owned small business concerns, at least 8 percent of NASA's procurement dollars under prime contracts or subcontracts awarded in support of authorized programs, including the space station by the time operational status is obtained.

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(c) The contractor hereby agrees to assist NASA in achieving this goal by using its best efforts to award subcontracts to such entities to the fullest extent consistent with efficient contract performance.

(d) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as small disadvantaged business concerns, Historically Black Colleges and Universities, minority institutions, and women-owned small business concerns.

(End of clause)

I. 14 MINIMUM INSURANCE COVERAGE (1852.228-75) (OCT 1988)

The Contractor shall obtain and maintain insurance coverage as follows for the performance of this contract:

(a) Worker's compensation and employer's liability insurance as required by applicable Federal and state workers' compensation and occupational disease statutes. If occupational diseases are not compensable under those statutes, they shall be covered under the employer's liability section of the insurance policy, except when contract operations are so commingled with the Contractor's commercial operations that it would not be practical. The employer's liability coverage shall be at least \$100,000, except in States with exclusive or monopolistic funds that do not permit workers' compensation to be written by private carriers.

(b) Comprehensive general (bodily injury) liability insurance of at least \$500,000 per occurrence.

(c) Motor vehicle liability insurance written on the comprehensive form of policy which provides for bodily injury and property damage liability covering the operation of all motor vehicles used in connection with performing the contract. Policies covering motor vehicles operated in the United States shall provide coverage of at least \$200,000 per person and \$500,000 per occurrence for bodily injury liability and \$20,000 per occurrence for property damage. The amount of liability coverage on other policies shall be commensurate with any legal requirements of the locality and sufficient to meet normal and customary claims.

(d) Comprehensive general and motor vehicle liability policies shall contain a provision worded as follows:

"The insurance company waives any right of subrogation against the United States of America which may arise by reason of any payment under the policy."

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(e) When aircraft are used in connection with performing the contract, aircraft public and passenger liability insurance of at least \$200,000 per person and \$500,000 per occurrence for bodily injury, other than passenger liability, and \$200,000 per occurrence for property damage. Coverage for passenger liability bodily injury shall be at least \$200,000 multiplied by the number of seats or passengers, whichever is greater.

(End of clause)

I. 15 CENTER FOR AEROSPACE INFORMATION (1852.235-70) (DEC 2006)

(a) The Contractor should register with and avail itself of the services provided by the NASA Center for Aerospace Information (CASI) (<http://www.sti.nasa.gov>) for the conduct of research or research and development required under this contract. CASI provides a variety of services and products as a NASA repository and database of research information, which may enhance contract performance.

(b) Should the CASI information or service requested by the Contractor be unavailable or not in the exact form necessary by the Contractor, neither CASI nor NASA is obligated to search for or change the format of the information. A failure to furnish information shall not entitle the Contractor to an equitable adjustment under the terms and conditions of this contract.

(c) Information regarding CASI and the services available can be obtained at the Internet address contained in paragraph (a) of this clause.

(End of clause)

I. 16 EMERGENCY EVACUATION PROCEDURES (1852.237-70) (DEC 1988)

The Contractor shall assure that its personnel at Government facilities are familiar with the functions of the Government's emergency evacuation procedures. If requested by the Contracting Officer, the Contractor shall designate an individual or individuals as contact points to provide for efficient and rapid evacuation of the facility if and when required.

(End of clause)

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I.17 AUTHORIZED DEVIATIONS IN CLAUSES (52.252-6) (APR 1984)

(a) The use in this solicitation or contract of any Federal Acquisition Regulation (48 CFR Chapter 1) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the clause.

(b) The use in this solicitation or contract of any none {insert regulation name} (48 CFR___) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the clause.

[END OF SECTION]

**SECTION J OF CONTRACT NNG07CA22C
LIST OF ATTACHMENTS**

J.1 LIST OF ATTACHMENTS (GSFC 52.211-101) (OCT 1988)

The following attachments constitute part of this contract:

Attachment	Description	Date	No. of Pages
A	Statement of Work	2/06	46
B	Direct Labor Rates, Indirect Rates, and Award Fee Matrices	TBP	TBP
C	Financial Management Reporting Requirements	2/06	4
D	DD Form 254, Contract Security Classification Specification	2/06	3
E	Safety and Health Plan	7/06	34
F	Mission Assurance Plan (MAP)	7/06	41
G	Information Technology (IT) Security Plan AND Assessment Plans	30 days after contract award	TBD
H	Organizational Conflicts of Interest Avoidance Plan	30 days after contract award	TBD
I	PIV Card Issuance Procedures	12/2006	4

[END OF SECTION]

ATTACHMENT A
Contract NNG07CA22C



NASA
GODDARD SPACE FLIGHT CENTER

STATEMENT OF WORK

FOR

MECHANICAL SYSTEMS
ENGINEERING SERVICES II/B

(MSES II/ B)

FOR THE

APPLIED ENGINEERING AND
TECHNOLOGY DIRECTORATE (AETD)

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INTRODUCTION

The National Aeronautics and Space Administration (NASA) was established to plan, direct, and conduct aeronautical and space activities for peaceful purposes for the benefit of all mankind. The operational aspects of NASA's work are divided among field installations around the country and involve research and development activities under the responsibility of four technical program offices at NASA Headquarters.

The Goddard Space Flight Center (GSFC) is located in Greenbelt, Maryland and reports to the Office of Science. The GSFC is chartered to expand the knowledge of the earth and its environment, the solar system, and the universe through observations from space. To this end, the GSFC's primary emphasis is in scientific investigation, in the development and operation of space systems, and in the advancement of essential technologies. In accomplishing this responsibility, the GSFC has undertaken a broad program of scientific research, both theoretical and experimental, in the study of space phenomena and earth sciences. The program ranges from basic research to flight experiment developments and from mission operations to data analysis.

Within the GSFC, the Applied Engineering Technology Directorate (AETD) plans, organizes, and conducts a broad range of technical research and development activities in support of science applications. The AETD is responsible for providing engineering expertise and support in the formulation, design, development, fabrication, integration, test, verification, and operation of components, subsystems, systems, science instruments, and complete spacecraft for multiple projects. The specific components, subsystems, systems, and science instruments are ultimately integrated into the spacecraft to form a science observatory. It is these observatories that are launched to fulfill the mission of the GSFC. The AETD comprises five engineering divisions: the Mechanical Systems Division (MSD), the Information Systems Division (ISD), the Instrument Systems and Technology Division (ISTD), the Electrical Engineering Division (EED), and the Mission Engineering and Systems Analysis Division (MESA).

To fulfill these responsibilities and ultimately achieve their missions, GSFC must acquire a wide range of engineering services in support of its divisions to implement the GSFC mission.

SCOPE OF WORK

The purpose of this contract is to acquire mechanical engineering services and related services to MSD and select organizations throughout GSFC, as required, for the formulation, design, development, fabrication, integration, testing, verification, and operations of space flight and ground support hardware, including development and validation of new technologies to enable future space technology and science missions. The mechanical engineering areas of emphasis are: materials assurance engineering, structural analysis and dynamic loads, mechanical systems design, electromechanical design, thermal design, contamination and coatings engineering, manufacturing, integration, and test.

To this end, the contractor shall provide on/off-site engineering services, pursuant to task assignments issued by the Contracting Officer. These services shall include the personnel, facilities, and materials (unless otherwise provided by the Government) to accomplish the tasks.

Current engineering services provided rely on frequent face-to-face communication between the Government and its contractors. This includes meetings with the task manager and with various organizations throughout GSFC. The amount and form of communication varies from task to task. It will be necessary for the contractor's project managers and technical task managers to have the capability to attend frequent face-to-face meetings with Government personnel at the GSFC for a vast majority of the task orders to be issued in the future. The contractor shall have the capability to conduct these communications without being unproductive and inefficient.

Tasks orders will be issued to perform services in all aspects of mission and instrument development and implementation for components, subsystems, systems, science instruments, observatories, launch, spacecraft, and suborbital craft (e.g., aircraft, sounding rockets, UAVs, balloons), including attached shuttle or Space Station payloads, free-flying spacecraft, suborbital craft payloads, as well as ground support equipment, simulators, non-flight models, and prototypes; candidate, feasibility, and systems definition studies; systems engineering; analysis; preliminary design; detailed design; non-flight and flight fabrication; assembly; integration; test and verification; test instrumentation; launch, on-orbit and post-launch operations; research and technology unique to system development; parts and materials, technical facilities support, logistics, documentation; sustaining engineering; configuration management; mission assurance; architectural trades, performance, cost, risk assessment, and systems safety.

I. GENERAL RESPONSIBILITIES

The Contractor's responsibilities shall include the management of personnel, timely and effective implementation of task assignments, control and monitoring of contract and subcontract performance, management of scheduled deliveries, and timely and effective reporting to the Government. These responsibilities shall also include efficient cost management methods as well as procedures to ensure that the Government is aware of task assignment status and progress achieved.

The administration of the task assignments under this contract shall be handled via the Task Order Management Systems (TOMS) web-based software tool, to be provided by NASA's Goddard Space Flight Center. The contractor shall ensure computer system compatibility with the TOMS software compatibility requirements at all times. TOMS shall be the primary tool for administration of tasks under this contract.

II. PERFORMANCE MEASUREMENT

Performance-based statements of work/specifications will be used for establishing contract requirements. Therefore, each task assignment issued by the Contracting Officer will include, as a minimum, the following:

1. Statement of Work, including the requirements to be met, the standard(s) of performance/quality of work, and required deliverables (or other output)
2. Performance Specification (if applicable)
3. Applicable Documents (if required)
4. Period of Performance
5. Incentive Structure
6. Surveillance Plan
7. Contractor response evaluation criteria for purposes of technical recommendation for contractor selection

The Contractor shall be required to adhere to the performance measurements detailed in each task assignment.

III. TASKS

Services shall be required in one or more of the areas described in the scope above for any given task assignment. Services within the scope of this Statement of Work and specified in task assignments shall include, but not be limited to, the specific services delineated in the following sections.

FUNCTION 1 – Pre-Formulation and Formulation Services: Candidate, Preliminary Analysis, and Systems Definition Studies

The Contractor shall provide engineering services for mission concept development that integrate the aspects of flight systems, ground systems, instrument systems, and launch systems.

In general, the Contractor shall:

1. Produce pre-formulation and formulation phase study inputs for spacecraft, suborbital craft, instruments, and ground systems
2. Develop mission needs (mission objectives, measurement concept, and instrument concept) and mission design (mission requirements, architectural design, and operations concept).
3. Develop preliminary, relative cost and schedule estimates based on design alternatives, and identify and assess high-risk elements in designs
4. Document the history of design, qualification, flight experience, and modifications where existing components or subsystems are to be utilized
5. Identify interface requirements for pre-launch, launch, on-orbit servicing, or retrieval of flight hardware
6. Define interface engineering and management requirements
7. Prepare mission systems and operations documentation
8. Prepare requirements and specification packages that conform to applicable standards defined within task statement
9. Identify interfaces and prepare interface control documents
10. Provide technical inputs for problem-solving and/or design inputs in selected spacecraft, instruments, suborbital craft, ground system, and data disciplines

11. Analyze various reports (i.e., progress reports) delivered by the GSFC mission contractor(s) and provide recommendations to the project
12. Provide liaison and coordination services for project activities
13. Provide design services that include performance of preliminary design (leading to a Preliminary Design Review) of the subsystems, components, and assemblies that comprise the instrument/spacecraft/platform/launch system/ground system.

A. Candidate Study Services

The Contractor shall provide study services for the conceptual design and development of subsystems and systems, thereby participating in the identification of scientific objectives, mission requirements and technical concepts. Study products produced during this phase shall include, but are not limited to:

1. Strategic technology planning
2. Integration of joint missions, partnerships, and other collaborative efforts
3. Research/science/technology/cost trade studies
4. Candidate operations concepts
5. Candidate system architectures
6. Cost, schedule, and risk estimates
7. Research and technology unique to system development
8. Customer development support and outreach

B. Preliminary Analysis Study Services

The Contractor shall provide preliminary analysis study services focusing on analyzing mission requirements and establishing mission architectures in order to demonstrate that a credible, feasible design(s) exist(s). The Contractor shall develop top-level requirements and evaluation criteria, identify alternative operations/logistics concepts, and identify project constraints and system boundaries. Study products produced during this phase shall include, but are not limited to:

1.0 Analysis Services Specific Tasks – The Contractor shall perform analysis services tasks, including but not limited to:

- a. Preliminary system design of a feasible, but not necessarily optimum configuration.
- b. Assessment of technical risks, including identification of technical problems and the criticality of their solution to follow-on efforts, identification of those problems currently being addressed, and a judgment of effort and time likely to be necessary to find a practical solution.

- c. Identification of all recommended systems characteristics, including launch and control capability, tracking and data acquisition, facility considerations, and institutional base activities.
- d. Implementation plans, which include the identification of all major systems and subsystems.
- e. Preparation of the system design that forms the basis for implementing system development (hardware or software).
- f. Provide alternative design concepts including feasibility and risk studies, cost and schedule estimates, and advanced technology requirements.
- g. Prepare for and support the appropriate Phase A project and technical reviews and prepare Phase A project documentation as appropriate (see the NASA Systems Engineering Handbook, SP-610S, June 1995).

2.0 Documentation Specific Tasks – The Contractor shall document all results from the study in a Feasibility Study Report.

C. System Definition Study Services

The Contractor shall provide system definition and preliminary design study services to establish (and evolve) the project baseline(s). These shall include:

1.0 Analysis Services Specific Tasks – The Contractor shall perform system definition analysis services specific tasks, which may include but are not limited to the following:

- a. Define system requirements, system budgets (e.g., mass, power, memory), error budgets, system/subsystem requirements, software requirements, ground support equipment requirements, and integration and test requirements
- b. Identify all recommended system characteristics, defining the subsystem components and assemblies, identifying the required complement of flight and ground support equipment, specifying internal and external interfaces, and verifying that the recommended design approach's critical subsystems and components are within the state-of-the-art
- c. Provide a formal flow down of project-level performance requirements to a complete set of system and subsystem design specifications for both flight and ground elements. Phase B baseline information shall be developed including system requirements and verification requirements matrices, system architecture and work breakdown structures, operations concepts, "design-to" specifications at all levels, and project plans including schedule, resources, and acquisition strategies
- d. Perform risk assessments of all critical elements, describe the risks and control methods. The knowledge and use of Probability Risk Assessment (PRA), Failure Modes and Effects Analysis (FMEA) and Fault Tree Analysis (FTA) is required.

- e. Prepare the system design that shall form the basis for implementing/developing the system (hardware or software); define the tasks and sequence of tasks that shall be performed to provide orderly technical development, design, review, interface, test, and integration of the system; and provide the required plans (modeling, analysis, and simulation; configuration; logistics; information; software; verification; integration and test, etc.) for the effort
- f. Describe and document integrated mission architecture
- g. Prepare for and support the appropriate Phase B project and technical reviews and prepare Phase B project documentation as appropriate (see the NASA Systems Engineering Handbook, SP-610S, June 1995).

2.0 Documentation Specific Tasks – The Contractor shall document all results from the study effort in a Definition Study Report.

FUNCTION 2 – Implementation Phase Services – Mechanical Systems

The Contractor shall provide services to design, analyze, develop, fabricate, assemble, unit test, system integrate, verify, mission integrate, deploy, and operate hardware and software on spacecraft, platform, and/or payload as defined by this Statement of Work. The implementation phase services shall include:

A. Materials Engineering

The contractor shall provide materials engineering support in the area of Materials Assurance Engineering.

1.0 Materials Assurance Engineering

The contractor shall provide materials engineering support for the development and implementation of materials assurance programs for GSFC managed flight projects. Contractor materials engineers shall assist GSFC project engineers with the selection and application of materials and processes, plan and supervise investigations or evaluations, provide general materials program management and access the flight worthiness of all materials usage. This includes providing materials engineering expertise to projects and designers in the form of consultation, guidance and review. This support will address reliability, product assurance, and quality assurance.

a. Document Reviews

The contractor shall review all material usage lists and documentation associated with material applications. The contractor shall prepare reports that identify differences between contractor documentation and NASA requirements and recommend required changes. When needed, the contractor shall provide all materials support required for the success of the project.

b. Material Usage Lists

The contractor shall review and recommend flight usage for material lists for GSFC managed flight projects in accordance with project requirements. The review process shall identify materials and their usage as standard or nonstandard and as compliant or noncompliant. Materials Usage Agreements shall be reviewed and approved or disapproved. The maintenance and distribution of material lists shall address requirements such as revision tracking and approval status.

c. Facility Evaluations

The contractor shall evaluate GSFC and NASA contractor Materials Engineering, processing and quality facilities for required equipment, processes personnel, training and capability for producing flight quality hardware. The contractor shall prepare reports of findings and recommendations for bringing facilities into compliance with requirements.

d. Hardware Evaluation

The contractor shall support the audit of NASA and NASA contractor manufacturing of flight hardware, including in-process and end item inspections for compliance with agency and project requirements.

B. Structural Analysis and Loads Engineering

1.0 Finite Element Model Analysis

Generate finite element models (FEM's) of space flight and related structures with primary emphasis given to the use of the NASTRAN structural analysis program. The contractor shall utilize FEM pre- and post-processor software to aid in the development and modification, checkout and visualization of the NASTRAN models themselves as well as the FEM analysis results. FEM visualization processes shall include modern techniques for viewing static and dynamic deformations, forces, stresses, strains and applied loads (including temperature) that aid in the understanding of the model and analysis results. Model checkout processes shall include checks that test the mathematical validity of NASTRAN models prior to their use in analyses. In addition, capabilities must exist for the checkout, modification, and visualization of models for use in analyses that require combining FEM's from several diverse sources into an overall system model. This latter capability must address the possibility that some of the models may be delivered as FEM's in codes other than NASTRAN and must be converted to NASTRAN prior to performing the overall systems analyses in NASTRAN.

While the majority of associated tasks will utilize only the linear analysis capability of NASTRAN, from time to time some analyses can only be addressed with non-linear techniques. Such tasks might include, but are not limited to, generating FEM's to analyze structures with material or geometric non-linearities, thin-film wrinkling, and MEMS. Capability to use the non-linear capability of NASTRAN or other solvers shall be present. Capability to use the optimization routines of NASTRAN must also exist.

2.0 STS and ELV Flight Loads Analysis

Perform coupled launch vehicle/payload flight loads analyses on task specified payload configurations. Flight loads analyses include lift-off, ascent, descent, and landing for the Space Transportation System (STS) and launch and ascent for Expendable Launch Vehicles (ELV). These analyses may be directed toward determining envelope, preliminary design loads, or toward the determination of payload specific time-history transient flight loads. Load parameters required may be acceleration, displacement, force, or stress.

3.0 On-orbit Loads Analyses

Perform coupled on-orbit loads analyses on task specified payloads configurations for STS/payload, ELV/payload and ISS/payload combinations. Load parameters required shall include acceleration, displacement, force and stress.

Determine loads resulting from grappling of payloads using the STS Remote Manipulator System (RMS), from berthing of payloads to carrier structures in the Orbiter cargo bay, from re-positioning of payloads using motorized devices (such as pivoting mechanisms, rotators, etc.), from firings of the Orbiter Maneuvering System (OMS) and Reaction Control System (RCS) while the payload is grappled or berthed, from Extra-Vehicular Activities (EVAs), from Orbiter-induced venting or jet-plumes, from tip-off at the time of deployment, and from any other loading events that may occur during on-orbit operations. Loads from all ISS operations shall be included in on-orbit analyses for ISS/payload combinations.

4.0 Stress Analysis

Perform hardware related stress and margin of safety analyses of spacecraft structures, electromechanical devices, and mechanisms using both classical “hand” stress analysis and computerized stress analysis techniques. These analyses will be directed toward sizing the required structural members to obtain the required strength and stiffness characteristics and toward demonstrating required stress margins of safety. This activity is a necessary prerequisite for fracture control implementation using safe-life (fracture mechanics analysis) and fail-safe approaches.

5.0 Dynamic Analysis

Perform selected random vibration, frequency response, shock and vibroacoustic analyses to simulate spacecraft test and flight events. Analyses shall determine the acceleration, velocity, displacement, and force response of the hardware due to random, transient, sinusoidal vibration, acoustic, and transportation and handling environments. Derive equivalent test specifications, including force-limited or otherwise notched, which properly simulate dynamic flight environments and envelope transportation and handling loads.

6.0 Fracture Control

Develop fracture control plans for task specified STS payloads. Implement approved fracture control procedures. Perform fracture mechanics analyses in accordance with GSFC standards to ensure that the maximum crack size which can exist in structural elements, as determined by NDI test procedures, will not propagate to failure as a result of intended service usage. Perform fail-safe and containment analyses where appropriate to satisfy fracture control requirements. Support STS safety reviews for specific payloads as specified in task orders.

C. Mechanical Engineering

1.0 Mechanical Systems Development

Provide mechanical design and engineering services, including consultation services, for the support of GSFC spacecrafts and instruments being developed both in and out-of-house. Provide engineering services and/or consultation on mechanical requirements definition, review and optimization. Provide engineering services and/or consultation and/or review of structural loads, conceptual designs, detailed designs, integration plans, performance test plans, environmental qualification test plans, mass budgets, static and dynamic analyses for

concurrence with GSFC defined standards and practices. Develop risk and cost reduction plans. Provide support at task specified flight project meetings and reviews, which may require travel both within and outside the United States of America. Engineering services, consultation and/or review findings are to be documented in technical memorandums. Trip reports shall be submitted to the Task Monitor (TM) for all travel, and shall include a summary of activities, all assigned action items, and necessary schedule information.

2.0 Mechanical Design and Drawing Production

Perform detailed mechanical design studies, and provide designs and drawings of spacecraft structures, flight support and carrier structures, instrument structures, electromechanical devices, Ground Support Equipment (GSE), and mechanisms.

Produce configuration layout and accommodation drawings and iterate these arrangement drawings, as necessary, to satisfy mission objectives and specific science requirements such as instrument fields-of-view, access and other packaging needs.

Provide conceptual designs and drawings of spacecraft structures, balloon structures, flight support and carrier structures, instrument structures, GSE, and mechanisms (i.e. deployable booms, choppers, shutter mechanisms, aperture doors, etc.). The contractor shall be capable of designing precision mechanical structures using both conventional metallic materials and advanced composite material systems, with detailed knowledge of composite laminate and sandwich design for dimensional stability.

Produce layout and detail fabrication drawings of all hardware mentioned above in Computer Aided Design (CAD) format fully compatible, at a minimum, with current releases of the following CAD tools: I-DEAS and Pro-Engineer. In some instances, the use of Auto-Cad and/or SolidWorks shall be required under a task order.

3.0 Mechanical Drawing Checking

Provide detailed mechanical drawing checking in accordance with ANSI Y14.5M, *Dimensioning and Tolerancing* and 500-PG-8700.2.5, *GSFC Engineering Drawing Standards Manual*. Checking 'redlines', detailing necessary changes to make a drawing compliant with the above standard, shall be provided for each drawing or model checked. Alternative forms of documenting the necessary drawing corrections may be used if there is a benefit to the government, upon concurrence by the TM.

D. Electro-Mechanical Engineering

Electromechanical systems comprises mechanisms and their associated electronics, typically requiring precision motion, accomplished utilizing electromagnetic or other means for actuation, sensors for detecting velocity, position, or other physical parameters, along with a closed-loop or open-loop feedback controller. Design and analysis services shall be provided to perform concept trades, concept design, and detailed design of electromechanical systems

and their components. Fabrication, assembly, and testing services, including life testing, shall be provided so that the capability exists to develop prototype, ETU, and flight electromechanical systems. Types of electromechanical systems requiring expertise include magnetic bearings, active/smart structures, vibration isolation, and large aperture, lightweight systems. Severe environments that electromechanical systems are subjected to include, but are not limited to acoustic, EMI/EMC, magnetic, cryogenic, vacuum, 0-g, and launch vibration. Special handling and clean-room environments are to be utilized for assembly of mechanisms as appropriate.

The contractor shall provide analyses using CAD and simulation tools utilizing hardware and software compatible with those used by the Mechanical Systems Division. The contractor shall have expertise to set-up and operate electronic design and test equipment compatible with equipment used by the Mechanical Systems Division, and other equipment typically found in flight hardware development electrical and mechanical labs.

Mechanical related electromechanical tasks have mostly been covered in the mechanical section of this document. Tasks in addition, but not limited to, include design, analysis, selection, implementation, and testing of bearings, flex-pivots, and flexures. This requires expertise in bearing tribology as well as aerospace materials.

1.0 Robotics

Robotic systems are electromechanical systems that specifically are used for providing autonomous or remote manipulation. Robotic systems typically possess multiple joints such that multiple solutions exist for a manipulator to move from one location to another. For this reason, support services shall include analysis to solve statics and dynamics of serial and parallel kinematic systems, and controller software development to implement the appropriate solutions for those systems. Expertise will be required in the area of Orbital Replacement Units (ORUs), other robotically serviceable assemblies, and robotic manipulators and end-effectors, as necessary, to provide engineering support services.

2.0 Micro Electromechanical Systems (MEMS)

Micro Electromechanical Systems (MEMS) techniques will be applied to those applications requiring micro-miniaturization of mechanisms, or sub-assemblies of conventional mechanisms. Expertise in analysis and implementation of MEMS is required. This includes, but is not limited to, FEM analysis of small scale structures, materials, fabrication techniques, packaging, photolithography, lithography electroforming and molding (LIGA in German), interfacing with macro-components, micro-actuators, focused ion-beam milling and welding, and coatings and tribology issues.

3.0 Systems Design and Analysis

System level electromechanical tasks include, but are not limited to system identification and modeling, both linear and non-linear as appropriate using MATLAB/Simulink or a similar

modeling software. These models are used as a tool for design optimization, design verification, etc. Expertise in SISO and MIMO controllers is necessary.

4.0 Electronics and Electromagnetics

Electronics and electromagnetics related tasks shall include, but are not limited to, the design, analysis, fabrication, implementation and testing of: power electronic circuits for the drive and commutation of motors; precision, low noise signal conditioning and interface electronics for sensors, optical encoders, and thermistors; digital and microprocessor based controllers for the implementation of command and telemetry functions, embedded software for microprocessor based systems to implement digital filtering and control algorithms in sampled data systems, perform worst case, failure mode and performance sensitivity analysis of electronic systems to verify the suitability of the design for the range of operational and survival temperatures and the cosmic radiation environments; analysis, design, and troubleshooting of grounding, shielding, Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC) problems; the layout, fabrication, and population of printed circuit boards (PCB's); design and fabrication of the interconnecting harness for electronic assemblies; and the determination of the electromagnetic fields and the electromagnetically generated forces in electrical machinery. Expertise to provide design, analysis, fabrication, selection, implementation, and testing of electrical machines, actuators, and sensors is required.

E. Thermal Engineering

1.0 Thermal Design

Conceive and develop thermal and cryogenic designs for spacecraft and instrument systems and balloon payloads. Determine thermal interfaces between instruments and their support structure. Develop plans and/or procedures for thermal analyses and verification testing. Review, evaluate, analyze, and report on thermal design, implementation and development.

2.0 Thermal Analyses

Perform thermal analyses for spacecraft bus, and STS, ISS, ELV and balloon payloads. Develop analytical mathematical models, including thermal mathematical models and geometric mathematical models, representing conductive and radiative heat transfer both internal and external to the spacecraft and payload, and including convection effects for balloon payloads. Determine heat fluxes, temperature distributions, and temperature gradients for all specified spacecraft and payload components and locations for all flight and on-orbit conditions and launch and landing sites if required. Perform thermal analyses and design studies for cryogenically cooled instruments, subsystems, and components. All thermal analysis software utilized must be compatible with Systems Improved Numerical Differencing Analyzer (SINDA), Thermal Radiation Analyzer System (TRASYS), Thermal Synthesizer Systems (TSS), Finite Element Modeling and Post-processing (FEMAP/TCON), Simplified Space Payload Thermal Analyzer (SSPTA), Thermal Desktop, or Thermal Model Generator (TMG) software packages.

3.0 Thermal Device Design

Provide design of thermal subsystem components including thermal blankets of all types, heat pipes, Capillary Pumped Loops (CPL), Loop Heat Pipes (LHP), heaters, coatings, radiators, thermoelectric coolers and other thermal control systems and devices.

4.0 Cryogenic GSE

Perform thermal analysis and design for cryogenic GSE, including dewar systems; dewar subsystems and components; and optical, opto-mechanical, electrical, and electro-mechanical GSE required to operate at cryogenic temperatures.

5.0 Thermal Laboratory Support

Provide electrical, mechanical, and software engineering; and mechanical and electrical technician support for the fabrication and test of various thermal and contamination control devices for both flight and ground systems. Design, assembly, instrumentation, insulation, data processing and display, tests and reports of various systems, including two-phase thermal test beds is required. Support for the preparation, data processing, and testing of flight and ground systems in the thermal vacuum facilities is also included. Facility repair, upgrades to laboratory equipment, and maintenance of data processing systems is included.

6.0 Thermal Vacuum Test Support

Provide support in the area of thermal vacuum test and thermal balance test for spacecraft and instrument systems and balloon payloads. Prepare or review test plans, test procedures, and test reports. Perform pre-test temperature predictions and post-test thermal correlations.

F. Contamination and Coatings Engineering

1.0 Contamination Engineering Management

Develop contamination control plans for spacecraft, instruments, ground support equipment, and flight experiments. Determine contamination control requirements, and develop appropriate monitoring plans and procedures to assess contamination control requirements compliance. Monitor, review, evaluate, analyze, and report on overall contamination engineering management implementation and development. Support project meetings at the spacecraft and instrument level, support and present at project reviews, support technical interchange meetings, peer reviews, working group meetings, failure review boards, facility cleanliness surveys/evaluations, lessons learned, knowledge capture, and other project meetings at vendor sites (as required). Provide support for implementation of contamination control plans and requirements at vendor sites and at launch sites.

2.0 Contamination Engineering Analysis

Develop analytical transport models (molecular, thruster plume, and/or particulate) for spacecraft and instrument systems and/or other space flight hardware and generate contamination hazards predictions. Perform detailed environmental analyses of all phases of assembly, integration, test, transportation, pre-launch (i.e., payload processing facilities, launch pad), launch, on-orbit, descent, and landing and compare against requirements. Establish surface contamination limits based on allowable optical and thermal performance degradation and conduct tradeoff analyses, analyzing specifications and reviewing requirements.

Establish particulate and gaseous contamination limits for ambient temperature and cryogenic fluid systems.

Develop new, or improve existing contamination engineering analysis software.

Perform tape lift sampling and analysis according to GSFC 545-WI-8072.1.2, *Guidelines for Cleanroom Operations* and provide report of all events in IEST-STD-CC1246D, *Product Cleanliness Levels and Contamination Control Program*, and percent area covered formats where requested. Provide additional particulate contamination analysis as needed.

Monitor and model outgassing tests of flight systems and their components at the systems and subsystem vacuum level tests. Perform data reduction of all contamination monitoring devices and present results in report format.

Analyze trends in clean room facilities for airborne particles and molecular depositions.

Make relevant analysis and predictions on the performance of ovens and space environmental test chambers. Determine suitability of test equipment for specific mission criteria. Develop requirements for contamination control ground support equipment and flight instruments.

3.0 Development and Use of Contamination Standards

Provide analysis and support for the development of GSFC, NASA, national and international contamination control standards. Develop, procure and calibrate, and test new equipment for the purpose of developing new standards or monitoring flight projects contamination control.

If necessary, support these activities off site. Write and present papers documenting the development of new techniques and standards in contamination control.

Become familiar with and use new standards as they are developed and become applicable and supercede existing standards.

4.0 Cleaning Support and Technology

Provide cleaning procedures, and precision cleaning, for GSE and flight hardware.

Investigate, develop, procure and calibrate, and test new cleaning techniques and applications to enhance our ability to provide and validate cleanliness of flight hardware. Techniques developed need to focus on surfaces that can be physically contacted with cleaning techniques as well as surfaces that cannot allow contact.

5.0 Thermal and Contamination Flight Experiments

Provide services to design, develop, fabricate, assemble, test, integrate, verify, and operate thermal and contamination flight experiments to be flown on flight platforms.

G. Manufacturing Engineering

Provide flight (including protoflight), and non-flight (including prototype) hardware fabrication and assembly support for spacecraft primary structure, secondary structure, instrument structures, mechanical subassemblies, components, mechanisms, electronics assemblies, electromechanical devices, thermal control devices and subsystems, and thermal flight experiments. All fabrication and assembly support shall be in accordance with the workmanship requirements of NASA-STD-8739.3 thru 8739.5 and IPC 6011, 6012, 6013, 6015, 6016, and 6018, as well as all subsequent updates to these documents. All fasteners used in assembling or installation shall conform to 541-PG-8072.1.2, GSFC fastener integrity plan. Also provide support to fabricate mechanical ground support equipment, special test and evaluation equipment (including electronic equipment) necessary to support the operation of all mechanical hardware. In situations where hardware fabrication is required in a quick reaction mode and the contractor decides to perform the task under subcontract, the contractor shall minimize both the subcontract implementation and fabrication phases of the task. Subcontractors used for fabrication and/or assembly shall be ISO 9001 compliant.

1.0 Thermal Devices and Materials

The contractor shall install active thermal control devices (heaters, thermostats, thermocouples, thermistors, heat pipes, CPLs, etc.). The contractor shall have the capability to install thermal coatings and other passive thermal materials and devices on space flight hardware (paints, chemical films, platings, oxide coatings, both ambient temperature and cryogenic temperature blanketing applications, etc.).

2.0 Hardware Protective Coatings

Provide protective or specific performance coatings such as iridite , anodize , electroless nickel plating, and gold plating. Be able to provide preparatory etching for dye penetrant testing and bonding applications on various materials such as aluminum, Invar, and Titanium. Provide services required to perform close tolerance masking of substrates prior to plating services such as anodize.

Prime and paint surfaces, parts and assemblies as required.

3.0 Composites

The contractor shall provide fabrication of composite structures, including but not limited to, flat laminates, honeycomb sandwich structures (composite and aluminum), tubes, and trusses. The contractor shall also provide unique tooling for composites manufacturing of custom shapes, including dimensionally stable, low distortion tooling. The contractor shall provide machining of composites, fixturing and facilities for bonding composite elements to form completed assemblies. The contractor shall provide for the co-cure and post cure of inserts into substrates of varying composition, located to a high degree of positional accuracy. The contractor shall develop, submit, and implement verification plans.

4.0 Electronics Fabrication and Assembly

a. Ground Support Equipment

The contractor shall design, build, test, and deliver ground support equipment to commercial standards and including applicable NASA standards as specified in the task orders. Where ground support equipment (GSE) interfaces with flight equipment an analysis shall be performed to assure the compatibility between the GSE equipment and the flight equipment. The contractor shall design the GSE such that no single failure can result in damage to the flight unit. If specified in the task, this shall be shown formally in a FMEA.

All GSE interfaces that connect to flight equipment shall be electrically tested before connection to flight hardware. If a modification is made to a GSE which affects a flight interface, the interface shall be re-tested prior to reconnection to flight hardware. GSE connectors which interface with flight hardware shall be maintained as flight connectors.

Formal quality assurance procedures shall be limited to flight interface circuitry and cables which contact flight hardware. Formal quality assurance shall be limited to a final inspection only. The contractor shall generate and accept without modification GSE drawings meeting commercial standards.

b. Harness

The contractor shall fabricate and test flight harnesses from drawings either GFE'd or developed by the contractor from GFE'd interface documentation such as connector definition drawings and Interface Control Drawings (ICD's). The contractor shall develop mechanical mockups of the payload as required. Flight harnesses shall be fabricated by flight solder and crimp certified technicians using standard space flight harnessing techniques except where new and unique methods are required for particular payloads and are developed in concert with the task technical monitor. Potting shall be performed by appropriately certified technicians. Proper assembly procedures shall be followed for all connector types.

H. Integration and Test Engineering

Integration and test services may need to be supported at various locations, including vendor sites, NASA Centers, and Military sites.

1.0 Integration

The contractor shall be required to assemble and integrate thermal, mechanical, electromechanical, and electronic flight systems and subsystems. This requires the design, fabrication, and operation of ground support equipment such as cryogenic dewars, command and telemetry simulators and computerized data acquisition systems.

2.0 Testing

The contractor shall be required to design test sequences, establish pass/fail criteria and write test procedures to characterize or verify the performance of the system under test; based on the performance requirements and the specified operational environment, choose the proper transducers, instrumentation and test equipment required for the test, conduct the test and subsequently, analyze the test data and prepare reports summarizing the test results. The contractor shall provide test and instrumentation capabilities to support these activities. The contractor shall be capable of operating Mechanical Systems Division compatible equipment such as a dynamic signal analyzers, spectrum analyzers, analog and digitizing oscilloscopes, multi-channel data acquisition hardware, tunable frequency discriminators, logic analyzers, voltage and current meters and strip chart recorders. Transducers typically used include accelerometers, force transducers, displacement sensors, thermistors, and gauss meters. Typical tasks in the area of test shall include, but are not limited to, the measurement of bearing torque, residual momentum, modal surveys of structures and mechanisms, measurement of transfer functions and transient behavior of thermal, structural, mechanical, electromechanical, and electronic components and systems; life testing of electromechanical assemblies; measurement of disturbance rejection and jitter performance; reduce and display test data, automate test sequences and data acquisition, implement signal processing algorithms to identify trends, extract modal parameters, calculate transfer functions and power spectral densities.

The Contractor shall test and/or participate in the GSFC's testing and qualification of hardware and software, including re-testing/re-qualification of spare units and breadboards previously developed for flight projects. These tests shall be conducted in accordance with Government-approved procedures and shall include both functional and environmental tests. Functional tests shall be designed and performed to demonstrate compliance with the operating requirements of the system. Environmental tests shall be designed and performed using environmental conditions that meet the launch, safety, and operations requirements of the assigned task. The Contractor shall perform the following:

- a. In-process testing during the fabrication process to demonstrate that the design meets the requirements specified.
 - i. X-ray, dye penetrant, and eddy current inspections, as well as other forms of nondestructive analysis
 - ii. Tests to develop/validate models for structural, mechanical, thermal, optical, power, and electronic components and assemblies
- b. Functional testing, including:
 - i. Verification of operational characteristics of components and equipment
 - ii. Testing at Government facilities

- iii. Testing and documentation to verify accuracy, repeatability, and stability while operating under simulated flight conditions
- c. Flight qualification testing on units that have successfully completed functional tests and have been prepared for space flight. These tests may be conducted at any of the levels of assembly specified in this Statement of Work, including on the spacecraft. The qualification tests shall be carried out in a test environment specified by the task order. The Government may provide test facilities and/or test equipment to the contractor, as specified in the task order. Flight qualification testing shall include:
- i. Vibration/Shock
 - ii. Magnetic
 - iii. Thermal vacuum
 - iv. Thermal balance
 - v. Static loads
 - vi. Acoustics
 - vii. Mass properties
 - viii. Alignment
 - ix. Electromagnetic interference (EMI)
 - x. Electromagnetic compatibility (EMC)
 - xi. Gravity effects
 - xii. Life tests
 - xiii. Modal survey
 - xiv. Deployments
 - xv. Mechanism Performance

3.0 De-Integration

The contractor shall be required to disassemble and de-integrate thermal, mechanical, electromechanical, and electronic flight systems and subsystems.

FUNCTION 3 – Implementation Phase Services - Related discipline engineering

A. Mission Systems Engineering

The Contractor shall provide systems engineering support for project development, reporting progress, and conformance to appropriate practices and specifications (see the GPR 7120.5A *Systems Engineering*). This shall include:

1.0 Systems Engineering Specific Tasks – The Contractor shall perform key mission and spacecraft-level systems engineering functions that include, but are not limited to the following:

a. Operations Concept Development & Support:

- i. Developing the operations concept
- ii. Preparing/reviewing mission operations concepts in regards to the intended functionality and interfaces among the flight subsystems and the ground
- iii. Generating Mission Operations Concept Documents (ConOps)
- iv. Participating in user interface meetings and joint integrated mission simulation training aimed at developing viable user operations
- v. Supporting satellite operations
- vi. Analyzing flight anomalies and recommending implementing appropriate actions
- vii. Working with principal investigator and science working group in planning operations
- viii. Supporting “lessons learned” presentations
- ix. Preparing plans for and supporting mission disposal operations

b. Architecture & Design Development:

- i. Defining systems and conducting trade-off studies/design studies for spacecraft, suborbital craft, instruments, space segments and ground segments
- ii. Reviewing software development and software system test activities
- iii. Generating and maintaining and/or reviewing system block diagrams

c. Requirements Analysis, Identification and Management:

- i. Generating and managing and/or reviewing Level 1 and 2 requirements
- ii. Conducting requirements traceability
- iii. Documenting specified and lower level derived requirements to demonstrate that performance requirements are met
- iv. Reviewing/performing independent design and development requirements analyses, and submitting comments and recommendations
- v. Reviewing technical specifications, and submitting comments and recommendations
- vi. Providing specification of Requirements for Design, non-flight fabrication, and checkout of ground support equipment
- vii. Reviewing contamination control requirements

viii Reviewing operating plans and procedures for cryogenics, fuels, and other hazardous materials

d. Validation and Verification:

- i. Generating and/or reviewing Verification Plans
- ii. Performing design, drawing, and specification reviews
- iii. Providing comments and/or recommendations to ensure:
 - 1) that designs meet specification and interface requirements,
 - 2) that appropriate parts standards are compatible with specified mission requirements and risk levels,
 - 3) that detailed specifications are compatible with mission requirements, including margin and error budgets,
 - 4) and that proper consideration is given to cost, reliability, safety, non-flight fabrication requirements, contamination control, magnetic materials/interference, launch requirements, and space environmental requirements.
- iv. Documentation and/or review of system qualification requirements
- v. Preparing and/or reviewing hardware and software integration plans and procedures, and witnessing execution
- vi. Preparing and/or reviewing detailed functional and environmental test plans and procedures, and witnessing test execution
- vii. Ensuring that the technical aspects of shipping requirements and equipment are met
- viii. Preparing and/or reviewing plans for launch site checkout, integration and testing of flight systems, including adequacy of the launch site facility
- ix. Analyzing data from spacecraft telemetry data sources to ensure total system compatibility
- x. Analyzing Flight performance from flight data

e. Interfaces and ICDs:

- i. Reviewing and analyzing design interfaces
- ii. Identifying interface control requirements for engineering and design components for launch, on-orbit servicing, or retrieval of flight hardware
- iii. Preparing, reviewing, and analyzing interface documentation for mission systems
- iv. Preparing interface control documents and verifying proper implementation for flight and ground subsystems and systems
- v. Controlling external interface documentation and requirements

f. Mission Environments:

- i. Defining and/or reviewing subsystem and hardware specifications to ensure that they meet the specific mission or spacecraft environment. Mission or spacecraft environment includes the following discipline areas:
 - Mechanical systems
 - Electrical systems
 - EMI/EMC
 - Grounding

- Thermal
- Radiation shielding
- Parts engineering
- Contamination
- Reliability
- Charging
- Timing and time distribution
- Data rates
- Safety
- Orbital debris assessment

g. Technical Resource Budget Tracking:

- i. Documenting and controlling and/or Review of budget plans, including power, thermal, data storage, computer processing and communication through-put , attitude control, timing, mass properties, etc., both at the flight system level and allocated to lower levels of assembly; this shall include error margins, where applicable
- ii. Documenting command and telemetry signal margin plan, including bit error rates

h. Risk Analysis, Reduction, and Management:

- i. Identifying high risk elements and developing/executing contingency plans for controlling the high risk elements
- ii. Reviewing contractor risk management plans and commenting on alternate approaches

i. System Milestone Review Candidates:

- i. Conducting and documenting internal design reviews
- ii. Supporting standards definition and review
- iii. Attending and conducting technical meetings/design reviews, and submitting comments and recommendations
- iv. Preparing and presenting of technical information for technical conferences/reviews/briefings

j. Configuration Management and Documentation:

- i. Analyzing configuration, design, anomaly resolutions, and procedural changes submitted to change control boards. Providing the services and functions stated in Section G of this document.

k. Systems Engineering Management Plan:

- i. Generating System Engineering Management Plans (SEMP)
- ii. Documenting/reviewing system, subsystem and organizational processes in terms of ISO compliance and CMMI assessments
- iii. Developing or reviewing existing systems engineering tools for applicability as required
- iv. Review of Fabrication Plans

B. Instrument Systems Engineering

The Contractor shall provide instrument systems engineering support for project development, reporting progress and conformance to appropriate practices and specifications (see the GPR 7120.5A, *Systems Engineering*). This shall include:

1.0 Systems Engineering Specific Tasks– The Contractor shall perform key Instrument systems engineering functions that include, but are not limited to the following:

a. Instrument Data Processing Development & Support:

- i. Develop Instrument data processing concepts.
- ii. Develop hardware and software designs for the Instrument Data Processing Center.
- iii. Perform Systems analysis of Instrument Data Processing Center to verify performance.
- iv. Develop Instrument operations concepts.
- v. Support instrument operations.
- vi. Analyze flight anomalies and recommending implementing appropriate actions.
- vii. Work with principal investigator and science working group in planning operations.
- viii. Support “lessons learned” presentations post-launch.

b. Instrument Architecture & Design Development:

- i. Define systems and conduct trade-off studies/design studies for Instruments, space segments and ground segments.
- ii. Develop Instrument Architectures
- iii. Review subsystem development and test activities.
- iv. Generate and maintain and/or review system block diagrams.

c. Requirements Analysis, Identification and Management:

- i. Generate and manage and/or review Level 1 and 2 requirements.
- ii. Conduct requirements traceability.
- iii. Document specified and lower level derived requirements to demonstrate that performance requirements are met.
- iv. Review/perform independent design and development requirements analyses, and submit comments and recommendations.

- v. Review technical specifications, and submit comments and recommendations.
- vi. Provide specification of Requirements for Design, non-flight fabrication, and checkout of ground support equipment.
- vii. Review contamination control requirements.
- viii. Review operating plans and procedures for cryogenics, and other hazardous materials.

d. Validation and Verification:

- i. Generate and/or review Verification Plans.
- ii. Perform design, drawing, and specification reviews.
- iii. Provide comments and/or recommendations to ensure:
 - 1) That designs meet specification and interface requirements,
 - 2) That appropriate parts standards are compatible with specified mission requirements and risk levels,
 - 3) That detailed specifications are compatible with mission requirements, including margin and error budgets,
 - 4) That proper consideration is given to cost, reliability, safety, non-flight fabrication requirements, contamination control, magnetic materials/interference, launch requirements, and space environmental requirements
- iv. Document and/or review system qualification requirements.
- v. Prepare and/or review hardware and software integration plans and procedures, and witness execution.
- vi. Prepare and/or review detailed functional and environmental test plans and procedures, and witness test execution.
- vii. Ensure that the technical aspects of shipping requirements and equipment are met.
- viii. Prepare and/or review plans for launch site checkout, integration and testing of flight systems, including adequacy of the launch site facility.
- ix. Analyze data from spacecraft telemetry data sources to ensure total system compatibility.
- x. Analyze flight performance from flight data.

e. Interfaces and ICDs:

- i. Review and analyze design interfaces.
- ii. Identify interface control requirements for engineering and design of hardware for launch, on-orbit servicing, or retrieval of flight hardware.
- iii. Prepare, review, and analyze interface documentation for Instrument systems.
- iv. Prepare interface control documents and verify proper implementation for flight and ground Instrument subsystems and systems.
- v. Control external interface documentation and requirements.

f. Mission Environments:

- i. Define and/or review subsystem and hardware specifications to ensure that they meet the specific mission environment. Mission environment includes the following discipline areas:
 - Mechanical systems
 - Electrical systems
 - EMI/EMC
 - Grounding
 - Thermal
 - Radiation shielding
 - Parts engineering
 - Contamination
 - Reliability
 - Charging
 - Timing and time distribution
 - Data rates
 - Safety
 - Orbital debris assessment

g. Technical Resource Budget Tracking:

- i. Document and control and/or Review of budget plans, including power, thermal, data storage, computer processing and communication through-put , attitude control, timing, mass properties, etc., both at the flight system level and allocated to lower levels of assembly; this shall include error margins, where applicable.
- ii. Document command and telemetry signal margin plan, including bit error rates.

h. Risk Analysis, Reduction, and Management:

- i. Identify high risk elements and develop/execute contingency plans for controlling the high risk elements.
- ii. Review contractor risk management plans and comment on alternate approaches

i. System Milestone Review Candidates:

- i. Conduct and document internal design reviews
- ii. Support standards definition and review
- iii. Attend and conduct technical meetings/design reviews, and submit comments and recommendations
- iv. Prepare and present technical information for technical conferences, reviews, and briefings

j. Configuration Management and Documentation:

- i. Analyze configuration, design, and procedural changes submitted to change control boards

k. Systems Engineering Management Plan:

- i. Generate System Engineering Management Plans (SEMP)
- ii. Document/review system, subsystem and organizational processes terms of ISO compliance and CMMI assessments
- iii. Develop or review existing systems engineering tools for applicability as required
- iv. Review of Fabrication Plans

C. Optical Engineering Services

Develop advanced optical, opto-mechanical, opto-electronics and laser technology for components, subsystems, and systems for space-flight and GSE optical instrumentation to support new NASA missions and applications. Such technology might include novel materials for lightweight optical components, mounts, and support structures; state-of-the-art diffractive optics and characterization; novel thin film design, fabrication, and characterization processes, new optical design concepts and analysis techniques; state-of-the-art optical fabrication and test methods, high precision optical polishing manufacturing and analysis methods, etc.

1.0 Optical Design and Development

Provide optical design and analysis services to perform concept trades; concept design; detailed design; opto-mechanical component design; knowledge of lightweighting techniques; thin film/coating design; baffle and associated stray light rejection design; conceptual and detailed optical mount design, opto-mechanical layout and packaging; fabrication and alignment sensitivity analysis and tolerancing, optical system error budgeting; and development of component specifications for engineering drawings. Requires experience with optical design and analysis software, which is compatible with Code V, ZEMAX, or equivalent. Provide optical research and development involving prototype laboratory optical hardware, new optical algorithms for use in software codes, and novel optical designs and analysis techniques. Provide optical consulting with instrument teams, science principal investigators, and project managers. Experience with the design, analysis, fabrication, alignment, and test of cryogenic infrared and vacuum ultraviolet optical instrumentation is recommended.

2.0 Optical Analysis

Provide optical, opto-mechanical, electro-optical and RF analysis support at the conceptual, preliminary, and detailed stages of components, subsystems, instruments and spacecraft. This support shall include the following topics: Active and adaptive optics; geometrical and physical optics; deformable optics; diffraction; Gaussian beam propagation and interferometric modeling (fourier optics) with experience in the use of the GLAD, ASAP, FRED, or equivalent software; stray light/energy analysis requiring experience with ASAP, TracePro, or FRED software and understanding of stray light fundamentals; component tolerancing and tolerancing sensitivity; radiometry (receivers, detectors and detector arrays); image quality (geometrical and diffraction); throughput; polarization; alignment and calibration; high precision optical metrology; and guided wave optics.

The contractor shall be capable of supporting all, including optical, analysis aspects of an interdisciplinary Structural-Thermal-Optical Performance (STOP) analysis task. This support includes conceiving physical transformations, implementing coordinate transformations, and developing the interface tools (macros, etc.) to accomplish this. The contractor shall support the subsystem, instrument and spacecraft analysis of system behavior and system error budgets and tolerances. The contractor shall also establish component tolerances based on allowable tolerance sensitivities, performance degradation, and error budgets. The contractor shall also provide cost estimates of proposed optical systems, including fabrication and testing.

3.0 Optical Component Fabrication and Test

The contractor shall provide optical component and related opto-mechanical hardware fabrication, assembly, and testing services in support of space flight and non-flight optical instrumentation and components. These services shall include the fabrication (includes cutting, grinding, polishing, tooling), assembly, and test of conventional and state-of-the-art non-typical precision optical components; cryogenic optical and opto-mechanical components; single point diamond turning fabrication; machining of non-optical glass components and hardware; in-process optical testing, characterization and integration including experience with metrology equipment; and opto-mechanical fabrication consulting to engineers, scientists, and project managers. These services may require the use of the GSFC Building 5 Opto-mechanical Fabrication facility. The contractor will be expected to use any of the following types of optical equipment: WYKO and ZYGO phase measuring interferometer, Davidson interferometer, use of precision optical flats and radius test plates, diamond band and rotary saws, diamond surface grinder, cylindrical grinder, spherical generator, precision milling machine, metal lathe, bench top and standing drill press, lapping spindles, loose abrasives, diamond turning machine, and high precision optical polishing and figuring instrumentation.

4.0 Optical Integration, Alignment, and Test

The contractor shall provide optical integration services necessary to install, align, and calibrate spacecraft or flight experiment instruments and components. These services may require integration operations in the GSFC Building 7/10/15/29 integration facilities, other NASA centers or contractor sites, and preflight operations at the launch site. The contractor shall provide optical alignment verification, testing, and calibration services on flight, engineering model, and ground system optical instruments, breadboards and components; perform active alignment of systems; and perform pre- and post-environmental test distortion effects measurements. These services may require the use of the GSFC Optical Test Facility and associated optical instrumentation and equipment which includes the Calibration, Integration and Alignment (CIA) facility, the Vertical and Horizontal Flow clean rooms, the Diffraction Grating Evaluation Facility in Building 5, and additional experimental test areas in Building 7 and Building 5; use of other NASA centers or contractor sites. The contractor might be expected to operate any of the following types of optical equipment: interferometers (i.e. ZYGO), angle generators, autocollimators, alignment telescopes,

collimators and telescopes, optical levels, theodolites, optical plummets, clinometers, lasers, optical metrology systems (i.e. AIMS 11), photometers, detectors, radiometers, monochrometers, and spectrometers.

D. Detector Engineering Services

The Contractor shall provide design services that include performance of detailed (leading to a Critical Design Review) design of the subsystems, components and assemblies that comprise the instrument/spacecraft/platform. This effort includes hardware and software (flight and ground) as well as ground support equipment (electrical, thermal, contamination, mechanical, and cryogenic). Documentation, including technical reports, drawings, schematics, block diagrams, layouts, parts and materials list, and equipment lists, shall be provided. Specific tasks shall include:

1.0 Detector Specific Tasks – The Contractor shall provide engineering services for state-of-the-art detection systems requiring low noise levels and calibrations traceable to physical standards including the design, development, test, and analysis of the following systems:

- a. RF
- b. Submillimeter wave
- c. Microwave
- d. Millimeter wave
- e. Infrared
- f. Visible
- g. X-ray
- h. Gamma-ray
- i. Neutral and charged particle detection
- j. MEMS
- k. Nanotechnology

E. Launch and Post-Launch Operations Support and Engineering

The Contractor shall supply launch and post-launch mission systems level, systems level, software, and ground systems support services for ELV, NSTS, sounding rocket, balloon, and aircraft-based missions, including:

1.0 Launch Site Preparation Specific Tasks – The Contractor shall provide system services at the launch site, including:

- a. Supports to payload system and its support equipment
- b. Interfaces to the mission operations control centers
- c. Technical services to facilitate interfacing with the launch site organization
- d. Development of launch site support requirements
- e. Development of launch site plans and procedures
- f. Assistance in shipment of the flight hardware and associated support equipment to and from the launch site

2.0 Launch Operations Specific Tasks – The Contractor shall provide launch and post-launch operations services for ELV, NSTS, sounding rocket, balloon, and aircraft-based missions, including:

- a. Assuring flight readiness of the payload and observatory system
- b. Pre-launch testing of the payload and observatory system
- c. Operation of associated ground support equipment
- d. Services to the launch vehicle team for payload integration to the vehicle at the launch facility

3.0 Mission Operation Support Specific Tasks – The Contractor shall provide mission operation engineering services, including services for the payload and for carrier and flight support system during mission operations.

4.0 Landing and De-Integration Specific Tasks – The Contractor shall provide landing and de-integration services, including services at the landing site for payload de-integration, post-flight testing, and payload shipment. This shall include suborbital craft and payloads recovery.

5.0 Refurbishment of Recovered Systems Specific Tasks – The Contractor shall provide refurbishment services for recovered flight systems.

6.0 Data Reduction Specific Tasks – The Contractor shall provide data reduction services, including:

- a. Compiling and analyzing systems performance data during and after the mission
- b. Reviewing and contributing to the implementation of proposed science data processing systems to ensure timely flow of accurate science data sets
- c. Reviewing the design and implementation of information data systems to identify sources of science data for investigative purposes, including existing databases and newly acquired data requirements to be scheduled
- d. Analyzing the development of data transfer systems and data status accounting systems for multiple science data processing centers

7.0 Documentation Specific Tasks – The Contractor shall provide post-flight summary reports, analyzing the performance of the system during flight.

F. Mission Assurance Engineering

The contractor's ISO 9001 quality management system and risk management processes shall extend to all flight hardware/software and critical GSE fabricated/provided under this contract.

1.0 Hardware Manufacturing Support

a. Institutional Fabrication Support

The contractor shall provide assistance for institutional fabrication efforts, including but not limited to the following:

- Performance or coordination of dye penetrant inspections per MIL-STD-6866
- Performance or coordination of fastener screening
- Performance or coordination of mechanical inspections
- Preparation of inspection reports for Material Review Board (MRB) action
- Review of work order authorizations
- Preparation of abstracts of MRB inspection results for database
- Review of subcontractor task orders
- Review of MRB, deviation, waiver, and failure report databases
- Maintenance of nonconforming materials hold areas

The contractor shall provide reports on manufacturing support activities as required in the task order. The contractor shall comply with all NASA and GSFC processes and procedures (NPRs, GPRs, PGs, WIs).

b. Integration and Test Activities

The contractor shall participate in integration and test activities, including but not limited to the following:

- Perform inspections, including documenting and stamping results
- Witness compliance with various procedures including crimping, contamination control, clean room activities, handling equipment (e.g. slings, cranes, hydrasets), hazardous operations, electrostatic discharge (ESD) control
- Ensure approved test procedures are used
- Ensure equipment calibration is in compliance with requirements
- Ensure that test anomalies and nonconformances are documented and close out resulting problem records
- Provide Quality Engineering inputs to work order authorizations

The contractor shall provide reports on review results as required by the applicable task order. The contractor shall comply with all NASA and GSFC processes and procedures (GPRs, PGs, WIs) when supporting institutional I&T activities.

c. Electrostatic Discharge (ESD) Control

The contractor shall comply with the ESD requirements of ANSI/ESD S20.20, "Protection of Electrical and Electronic Parts, Assemblies and Equipment"

2.0 Hardware Review

a. Incoming Mechanical Test and Inspection

The contractor shall conduct incoming mechanical test and inspection of flight hardware in accordance with appropriate NASA, manufacturer, contractor, and/or military drawings and specifications. These tests of physical parameters determine the compliance with the procurement specifications and engineering drawings and may involve pass/fail tests or variables data measurements. The contractor shall provide summary reports and certifications documenting the results of these tests. The contractor shall ensure that parts and materials are not released to flight stores or for kitting without appropriate certification, qualification, screening, or other required approvals or testing.

b. Problem Reporting System

The contractor shall use the GSFC problem reporting system when on site at GSFC. The contractor shall enter and track PR/PFRs received, perform trend analyses, and provide summaries in accordance with applicable procedures. The contractor's off-site procedures shall be consistent with the on-site processes.

c. Hardware Evaluations and Audits

The contractor shall support the audit of NASA and NASA contractor produced flight products, including but not limited to in-process and end-item inspections, for compliance with agency and project requirements.

3.0 Documentation Review

a. Review of Deliverables

The contractor shall review or coordinate deliverables for compliance with the applicable product assurance requirements and assurance implementation plan, including but not limited to the following:

- Waivers and deviations
- Materials and processes lists
- Limited life items lists
- Verification specifications, plans, procedures, and reports
- Hazard analyses
- Safety data packages
- Reliability analyses
- Worst case analyses
- Failure Modes, Effects, and Criticality Analyses (FMECAs)
- Risk management plans/approaches
- Application stress analyses

- Processes/procedures
- Fabrication flow charts
- Certification logs/Work Order Authorizations
- Mandatory Inspection Points (MIP)
- Nonconformance reports/Problem Reports/Problem Failure Reports
- Trend Analyses
- Risk Analyses
- Acceptance data packages

The contractor shall provide reports on review result, including conclusions regarding the adequacy of the deliverable to ensure compliance with applicable performance assurance requirements.

b. Electronics Packaging and Processes Document Reviews

The contractor shall review documentation associated with manufacture of hybrid circuits, printed circuit boards, printed wiring assemblies, and spacecraft assemblies for compliance to NASA workmanship and project requirements. The contractor shall prepare reports that identify differences between contractor documentation and NASA requirements and that recommend required changes.

c. Review of Flight Hardware Procurements

The contractor shall review procurement requests for flight hardware for inclusion of the applicable assurance provisions and provide written findings and recommendations.

4.0 Off-Site (Third-Party) Product Assurance Support

a. Manufacturing

The contractor shall review manufacturing flow plans for adequacy and review operational check points and report written results.

b. Test and Inspection

The contractor shall ensure specification compliance where verification is to be accomplished with program requirements, including disposition of CCB, MRB, and FRB actions. When appropriate or required, the contractor shall inspect hardware for conformance to PAR requirements.

c. Test Equipment Repair and Calibration

Off-site metrology and test equipment shall be repaired, calibrated and certified and in compliance with ISO/IEC 17025. On-site metrology and test equipment shall be repaired, calibrated and certified per GPR 8730.1.

G. System Safety Engineering

For all levels of flight hardware and software provided by the Contractor and specified by this Statement of Work, the Contractor shall establish and maintain a mission assurance program commensurate with mission requirements as specified by the task. The mission assurance program shall incorporate a system safety program which meets the requirements of NSTS 1700.7B, "Safety Policy and Requirements for Payloads Using the Space Transportation System" and KHB 1700.7B, "Space Shuttle Payload Ground Safety Handbook" for shuttle missions. For ELV missions at ETR or WTR, the system safety program shall meet the requirements of AFSPCMAN 91-710, "Air Force Space Command Manual Range Safety User Requirements."

The contractor shall establish and maintain practices, procedures, and processes that are ISO 9001 compliant.

1.0 Safety Specific Tasks – The Contractor shall provide safety services which conform to the system safety/mission assurance program, including:

- a. Establishing and documenting a systems safety plan in concert with the appropriate launch vehicle and NASA safety policy
- b. Conducting and assessing system safety analyses for flight designs and launch/retrieval operations to satisfy NASA safety and reliability requirements
- c. Analyzing design changes related to minimizing hazard levels
- d. Participating in system safety reviews
- e. Reviewing the proposed systems design to ensure that proper considerations are given to safety-critical areas, and that safety problems exposed in prior analyses, testing, and operational use of instruments and subsystems are corrected
- f. Conducting project test/validation programs for flight and critical ground systems software
- g. Preparing the Safety Data Package, including writing and editing
- h. Performing hazards analysis of flight system, shuttle interface equipment, and ground support equipment
- i. Participating in required inspection/testing to fulfill safety data requirements
- j. Coordinating with the GSFC safety officer and participating in formal safety reviews
- k. Preparing final safety data packages

H. Cryogenics and Fluids Engineering

Provide design, analysis, and design/analysis consultation on cryogenic hardware systems. Account for the effects of thermal transients and operations at cryogenic temperatures. These effects include thermal contraction; changes in material properties (mechanical, thermal, electrical, magnetic) as a function of temperature; and gaseous, liquid, and solid phase changes. Determine acceptable rates for cool-down and warm-up of the hardware as well as

acceptable number of thermal cycles. For stored cryogen systems examine materials compatibility, normal and emergency venting scenarios, and effects of vacuum and pressure requirements during all phases of ground and on-orbit operations. Designs or consultation services are to be documented via drawings, models, technical memorandum or reports as appropriate.

Some electromechanical devices will be required to operate at cryogenic temperatures. The contractor shall be cognizant of mechanical, structural, thermal, electrical, and magnetic changes that occur in motors, actuators, sensors, and other electromechanical devices when cooled to cryogenic temperatures. The contractor shall also be cognizant of the effect of cryogenic temperatures on lubricants and coatings and the deleterious impact of contaminants that might freeze out when cold. The contractor shall have expertise in cryogenic flight bearing tribology and shall provide design, analysis, selection, implementation, and testing services for the selection of bearings and their lubricants.

I. Parts and Materials Engineering

1.0 Government Furnished Parts and Equipment

The contractor shall keep a record of all Government furnished parts and equipment (GFE). Flight piece parts and equipment shall be kept in bonded storage.

All GFE parts and equipment that are intended for flight shall have any associated documentation that is furnished by the Government evaluated by the contractor for suitability for use under the applicable task quality assurance requirements; any discrepancies shall be noted and identified to the Government.

All GFE parts and equipment that are intended for flight shall be evaluated by the contractor for suitability for flight with hardware discrepancies noted and identified to the Government. The contractor shall provide for selection and kitting of government furnished parts to be utilized in the performance of task orders.

2.0 Contractor Purchased Parts

Contractor purchased, flight EEE parts shall conform to the parts program set forth in the applicable GSFC Performance Assurance Requirement.

J. ISS and STS Mission Engineering Management

The Contractor shall provide support in the development and maintenance of payload requirements and in the implementation of these requirements by the STS and ISS Programs. Support shall be provided in all phases of mission planning, including payload requirement definition, payload requirement implementation and flight execution. The contractor shall provide analytical support to ensure that the system level requirements are verified and met.

The Contractor shall provide technical support during regular payload team meetings, teleconferences, Integration and Test meetings, and quarterly reviews throughout the pre-

flight support period. The Contractor shall provide operations engineering support during the flight operations reviews, including the cargo integration review, flight operations review, payload operations working group, and the pre-ship review. Additionally, the contractor will provide operational support during payload safety analysis.

Mission management support staff shall have systems engineering responsibilities. These include technical review, update, and writing of STS and ISS payload interface and integration documentation related to payload systems analysis, design, environmental testing, ground, launch, and in-flight operations, and safety and operation of thermal, mechanical, and electromechanical systems. Meetings related to the discussion, organization, and implementation of these requirements shall be attended.

Additionally, the contractor shall coordinate and provide inputs to payload design drawings, and coordinate the development of the spacecraft and carrier interface control and interface requirements documents. These documents are detailed descriptions of the hardware, software, fabrication, assembly, and integration activities to be performed by each of the participating sponsoring or experiment organizations.

Contractor shall participate in compatibility studies prior to the integration of multiple experiments into specific flights. This work shall entail the review and analysis of various operational requirements and system configurations and a recommendation towards payload designs or requirements that will enhance mission operations success.

K. Configuration Management Services

The Contractor shall provide overall management and oversight of the Configuration Management (CM), Documentation Management (DM), and Quality Control Management (QCM) disciplines throughout the life cycle of flight hardware and software provided within the scope of this Statement of Work. Each discipline shall require the development, establishment, and implementation of procedures and processes and establishment of mechanisms and tools for consistency.

The Contractor shall support the planning, identification of processes, and leading GSFC Project efforts in these disciplines. This support shall also include the necessary planning and associated process development to assist the GSFC Project in meeting conformance requirements to NASA procedures and guidelines as well as the ISO standards

The main CM/DM/QCM functions shall include:

- Configuration identification, configuration control, configuration accounting and reporting
- configuration verification and configuration auditing
- implementation and maintenance of a DM system

The Contractor shall be responsible for providing the necessary tools and databases to accomplish the above functions; developing and establishing procedures and guidelines and training in the configuration management, documentation management, and ISO 9001 disciplines.

L. Hardware Refurbishment and Re-Use

The contractor shall provide support for refurbishment of previously flown flight hardware, in both the mechanical and electrical areas. Redesign and upgrades to the flight hardware shall be provided as required. Mechanical support shall consist of determination and tracking of maximum usable life, structural recertification as required by the particular project, inspection for defects that would prevent re-flight, and testing of mechanisms. Electrical support shall consist of reprogramming as required and functional testing at the box or subsystem level.

1.0 Mechanical

Much of the STS mechanical flight hardware is used for multiple missions. After each flight the hardware must undergo a post-flight inspection. Depending on the hardware and procedural requirements, this inspection may just be a visual inspection or it may involve non-destructive evaluation (NDE) methods or it may involve torque stripe inspection and torque verification. The contractor shall be required to perform hardware inspections, generating proper documentation and within schedule constraints, so that the hardware may be used in subsequent missions.

2.0 Electrical

Much STS electrical flight hardware is also used on multiple missions. After each flight, reusable electrical hardware must undergo a post-flight inspection, usually visual. The hardware is also subjected to functional testing using ground support equipment and bench checkout equipment. The contractor shall support such inspections and testing and shall follow approved test and checkout procedures. At times the contractor shall be required to modify or create new functional test procedures; the Government prior to use must approve all such procedures.

M. Training

The contractor shall provide training support of astronauts, the payload team (including the payload customer and staff), and the mission ground support team for space flight mission operations. Areas of training include flight documentation, mission re-planning and execution, flight rules, flight plan, payload operations control center operations, spacecraft to ground telecommunications, spacecraft attitude, and operational constraints.

In that mission simulations contribute to training of mission support staff, the contractor shall be responsible for planning and coordinating intra- and intercenter mission simulations prior to launch of the spacecraft and payload.

N. CAD/CAE Facility Support Services

Provide operational and technical support for the Code 540 CAD/CAE facilities and systems as needed. The key software tools in use are: NASTRAN, SDRC I-DEAS and PTC's Pro-Engineer running on a mixed network of Unix and latest Windows operating systems. The contractor shall also provide any needed training for any CAD/CAE software tools employed by the Mechanical Systems Division.

O. Hardware Storage

The contractor shall provide a temperature/humidity controlled area maintained between 60 degrees F and 80 degrees F with relative humidity maintained between 30% and 50%, and of at least 8,000 square feet where Government and contractor property including flight mechanical structures shall be stored. This facility shall be within the Washington Metropolitan area.

The contractor shall provide a temperature/humidity controlled area, with the same limits as the above property storage area, as a bonded storage facility of at least 700 square feet where flight electronics equipment and parts are stored. The contractor shall organize this area by tasks. Contractor task leaders shall have full authority and ability to remove/pull items associated with the corresponding task. Emergency procedures shall exist to allow access to bonded storage after normal working hours and on weekends.

FUNCTION 4 – RESEARCH AND TECHNOLOGY SERVICES

The contractor shall be able to perform the following list of research and technology development (R&TD) support services to support new NASA missions and applications, with emphasis on the services that have full descriptions below. R&TD support services under this contract shall include but not be limited to:

- Miniaturization and Micro-Electromechanical (MEMS) Devices
- Inflatable Structures
- Materials Development
- Magnetic Bearings
- Advanced Electro-mechanical Systems
- Light-weight precision deployable structures
- Robotics

A. Advanced Thermal Control Systems

Develop advanced thermal control technologies to support new NASA missions and applications. This might include capillary pumped loops, variable emittance thermal control surfaces, loop heat pipes, cryogenic heat pipes, heat pumps, alternative materials, and other such technologies. Support the development of thermal flight experiments.

B. Optics and Opto-Mechanical Systems

Develop advanced optical and opto-mechanical technology for components, subsystems, and systems for space-flight and GSE optical instrumentation to support new NASA missions and applications. Such technology might include novel materials for lightweight optical components, mounts, and support structures; state-of-the art diffractive optics and characterization; novel thin film design, fabrication, and characterization processes, new optical design concepts and analysis techniques; state-of-the-art optical fabrication and test methods, etc.

C. Cryogenic and Fluid Systems

Develop advanced cryogenic and fluid systems to support new NASA missions and applications. Such systems might include structural and thermal interfaces to mechanical refrigerators, components for an advanced adiabatic demagnetization refrigerator, and cryogenic actuators.

D. Advanced Coatings and Film Technology

Develop, procure and calibrate, and test new technology to apply, test, and maintain new or existing coatings and films. Provide offsite support for the use of these techniques. Write and present papers documenting the development and application of this new technology.

FUNCTION 5 – SUPPORT SERVICES

The Contractor shall provide support services covering all items within the scope of this SOW, as specified in task assignments. All work shall be performed in accordance with the latest versions of the applicable documents, specifications and standards under this SOW, and as further specified on individual task orders.

A. Documentation Services

The Contractor shall provide documentation services for all levels of hardware and software within the scope of this Statement of Work, as specified in task assignments. Documents shall conform to applicable documents and specifications. These shall include, but are not limited to, pertinent NHBs, SMAP, and/or Program/Project specific performance assurance guidelines, quality standards, GSFC standards, documents of other NASA Centers, Federal standards, military standards, and commercial standards.

The Contractor shall provide documentation services, including instrument conceptual designs, program plans, systems analyses, illustrations, technical and implementation plans, test plans, test procedures, test scripts, software documentation, and the full range of system hardware and software documentation. These shall also include up-to-date drawings, specifications, certifications, reports, interface control documents, and agreements.

1.0 Document Services Specific Tasks – The Contractor shall provide electronic media and document services, including:

- a. Technical writing
- b. Editing
- c. Drafting
- d. CAD/CAM
- e. Photographic
- f. Video
- g. Reproduction
- h. CD, DVD
- i. Posters and Displays

2.0 Photo and Video Specific Tasks – The Contractor shall use photos and video for maintenance, engineering, or as documentation to explain a problem. They shall become supplemental to assist in unit repair or future development and maintenance. A scale shall be included to indicate relative dimensions in photographs and/or video, where appropriate.

B. Sustaining Engineering Services

The Contractor shall provide sustaining engineering services for hardware and software within the scope of this Statement of Work, including:

1. Modifications of hardware/firmware and software, including installation of elements for improved reliability and/or performance
2. Modifications of wiring to improve circuit performance
3. Non-flight fabrication, assembly, wiring, and testing of printed circuit assemblies where necessary to update old circuitry or improve reliability
4. Engineering, non-flight fabrication, testing of assemblies or sub-assemblies to replace outdated circuitry to eliminate component or circuit failures
5. Engineering, non-flight fabrication, assembly, and testing of engineering circuits to correct problems encountered
6. Modifications of mechanical assemblies, structures, and mechanisms to correct or improve the design
7. Update of drawings, manuals, and technical data to reflect current status at the time of modifications
8. Firmware and software modifications in response to approved changes, including problem fixes.

C. Standards and Process

The Contractor shall provide support for engineering standards work and engineering process work, including:

1. International Standard Organization (ISO) documentation and process generation
2. Engineering standards documentation and review
3. Engineering process documentation
4. Activities in support of engineering process improvement

IV. APPLICABLE DOCUMENTS AND SPECIFICATIONS

The contractor shall adhere to all applicable portions of the following documents and/or specifications in the performance of this contract. Documents and specifications include, but are not limited to, those shown below. Additional applicable documents shall be specified on a task order basis. The latest updated version shall apply:

General:

NPR 7120.5C, "NASA Program and Project Management Processes and Requirements"
GPR 7120.5, "Systems Engineering"
GPR 8070.4, "Administration and Application of the Goddard Rules for the Design, Development, Verification and Operation of Flight Systems"
GSFC-STD-1000, "Rules for the Design, Development, Verification, and Operation of Flight Systems."

Launch Vehicles:

AFSPCMAN 91-710, "Air Force Space Command Manual Range Safety User Requirements"
NSTS 1700.7B, "Safety Policy and Requirements for Payloads Using the Space Transportation System"
KHB 1700.7B, "Space Shuttle Payload Ground Safety Handbook"

Conformal Coating and Staking:

NASA-STD-8739.1, "Workmanship Standard for Staking and Conformal Coating of Printed Wiring Boards and Electronic Assemblies"

Soldering – Flight, Surface Mount Technology:

NASA-STD-8739.2, "Surface Mount Technology"

Soldering – Flight, Manual (hand):

NASA-STD-8739.3, "Soldered Electrical Connections"

Soldering – Ground Systems:

Association Connecting Electronics Industries (IPC)/Electronics Industry Alliance (EIA)
J-STD-001C, "Requirements for Soldered Electrical and Electronic Assemblies"

Electronic Assemblies – Ground Systems:

IPC-A-610D, "Acceptability of Electronic Assemblies"

Crimping, Wiring, and Harnessing:

NASA-STD-8739.4, "Crimping, Interconnecting Cables, Harnesses, and Wiring"

Fiber Optics:

NASA-STD-8739.5, "Fiber Optic Terminations, Cable Assemblies, and Installation"

Electro-Static Discharge (ESD) Control:

ANSI/ESD S20.20, "Protection of Electrical and Electronic Parts, Assemblies and Equipment" (excluding electrically initiated explosive devices)

Printed Wiring Board (PWB) Design:

500-PG-8700.2.2, Electronics Design and Development Guidelines

500-PG-8700.2.4, Mechanical Design and Development Guidelines,

GSFC X-673-64-1F, "Engineering Drawing Standards Manual" (December 1994)

IPC-2221, "Generic Standard on Printed Board Design"

IPC-2222, "Sectional Design Standard for Rigid Organic Printed Boards"

IPC-2223, "Sectional Design Standard for Flexible Printed Boards"

PWB Manufacture:

EEE-INST-002, "Instructions for EEE Parts Selection, Screening, and Qualification"

IPC A-600, "Guidelines for Acceptability of Printed Boards"

IPC-6011, "Generic Performance Specification for Printed Boards"

IPC-6012, "Qualification and Performance Specification for Rigid Printed Boards"

IPC-6013 "Qualification and Performance Specification for Flexible Printed Boards"

IPC-6018 "Microwave End Product Board Inspection and Test"

IT System Administration

NASA PIC 04-03, "System Administration Security Certification Program"

Mechanical Design

541-PG-8072.1.2, "GSFC Fastener Integrity Requirements"

Testing

GSFC-STD-7000, "General Environmental Verification Specification" (GEVS)

V. REFERENCE DOCUMENTS AND SPECIFICATIONS

The following documents and/or specifications are provided as reference material for the performance of this contract. The latest updated version shall apply:

SP-610S, NASA Systems Engineering Handbook, June 1995

VI. ACRONYM LIST

ACS	Attitude Control System
ADP	Automatic Data Processing
AETD	Applied Engineering and Technology Directorate
AIMS	Aerial Image Measuring Systems
ANSI	American National Standards Institute
ASAP	Advanced Sensor Analysis Program
ASIC	Application-Specific Integration Circuit
ASTM	American Society for Testing Materials
BSDF	Bidirectional Scattering Distribution Function
CAD	Computer Aided Design
CAE	Computer Aided Engineering
CAM	Computer Aided Manufacturing
CCB	Change Control Board
CD	Compact Disk
C&DH	Communication and Data Handling
CIA	Calibration, Integration and Alignment
CM	Configuration Management
CMMI	Capability Maturity Model® Integration
CNE	Center Network Environment
CODE V	Optical Design Software by Optical Research Associates (ORA)
COTR	Contracting Officer's Technical Representative
CPL	Capillary Pumped Loop
CVCM	Collected Volatile Condensable Materials
DM	Documentation Management
DVD	Digital Video Disk
EED	Electrical Engineering Division
EEE	Electronic, Electrical, and Electromechanical
ELV	Expendable Launch Vehicle
EMI	Electromagnetic Interference
EMC	Electromagnetic Compatibility
EP	Electrical Propulsion
ESD	Electro-Static Discharge
ETR	Eastern Test Range
ETU	Engineering Test Unit
EVA	Extra-Vehicular Activities
EWR	Eastern/Western Range
F	Fahrenheit
FEM	Finite Element Model
FEMAP	Finite Element Modeling and Post-processing
FFTb	Formation Flying Test Bed
FMEA	Failure Modes and Effects Analysis

FMECA	Failure Modes, Effects, and Criticality Analysis
FPGA	Field Programmable Gate Array
FRB	Failure Review Board
FRED	Optical Software Engineering Package by Photon Engineering
FTA	Fault Tree Analysis
GEVS-SE	General Environmental Verification Specification For STS & ELV Payloads, Subsystems, and Components
GFE	Government Furnished Equipment
GIDEP	Government Interagency Data Exchange Program
GLAD	Physical Optics and Laser Analysis Software by Applied Optics Research
GN&C	Guidance Navigation and Control
GPR	Goddard Procedural Requirements
GPIB	General-Purpose Interface Bus
GSE	Ground Support Equipment
GSFC	Goddard Space Flight Center
GUI	Graphical User Interface
ICD	Interface Control Drawing/Document
IDEAS	Software by EDS (formerly by Structural Dynamics Research Corporation)
IEC	International Electrotechnical Commission
IEST	Institute of Environmental Sciences and Technology
IMDC	Integrated Mission Design Center
ISO	International Standard Organization
ISS	International Space Station
ISTD	Instrument Systems and Technology Division
IT	Information Technology
I&T	Integration and Test
ITS	Information Technology Security
LAN	Local Area Network
LHP	Loop Heat Pipes
LIGA	German Acronym for Lithography, Plating and Molding
MEMS	Micro Electromechanical
MESA	Mission Engineering and Systems Analysis Division
MIL	Military
MIMO	Multiple Input/Multiple Output
MIP	Mandatory Inspection Point
MOLEKIT	Molecular Kinetics
MRB	Material Review Board
MSD	Mechanical Systems Division
MSES	Mechanical Systems Engineering Services
N	Newton
NASA	National Aeronautics and Space Administration
NASTRAN	NASA Structural Analysis Program
NDE	Nondestructive Evaluation

NDI	Non-destructive Inspection
NHB	NASA Handbook
NPR	NASA Procedures and Requirements
NSTS	National Space Transportation System
OMS	Orbiter Maneuvering System
ORU	Orbital Replacement Unit
PAR	Product Assurance Requirement
PCB	Printed Circuit Board
PFR	Problem Failure Reporting
PG	Procedures and Guidelines
PIC	Procurement Information Circular
PR	Problem Reporting
PRA	Probability Risk Assessment
PWB	Printed Wiring Board
QCM	Quality Control Management
REA	Radiation Effects Analysis
RF	Radio Frequency
RMS	STS Remote Manipulator System
R&TD	Research and Technology Development
SEMP	System Engineering Management Plans
SINDA	Systems Improved Numerical Differencing Analyzer
SISO	Single Input/Single Output
SMAP	Software Mission Assurance Plan
SSPTA	Simplified Space Payload Thermal Analyzer
STD	Standard
STOL	Spacecraft Testing and Operations Language
STOP	Structural-Thermal-Optical Performance
STS	Space Transportation System
TCON	TCON™ is a thermal modeling tool developed by Frederick A. Costello, Inc.
TM	Task Monitor
TMG	Thermal Model Generator
TML	Total Mass Loss
TOMS	Task Order Management System
TRASYS	Thermal Radiation Analyzer System
TSS	Thermal Synthesizer Systems
UAV	Unmanned Aerial Vehicle
UNIX	Operating System Software
UV	Ultra Violet
WI	Work Instruction
WTR	Western Test Range
WVR	Water Vapor Regained
ZEMAX	Optical Design Software Program by ZEMAX Development Corporation
ZYGO	Brand name of optical metrology equipment by Zygo Corporation

FINANCIAL MANAGEMENT REPORTING REQUIREMENTS

General

Financial Management Reports shall be submitted by the Contractor on the NASA 533 series reports, in accordance with the instructions on the reverse of the forms, NASA Procedures and Guidelines NPR 9501.2D entitled, "NASA Contractor Financial Management Reporting," effective date May 23, 2001, and additional instructions issued by the Contracting Officer.

a. Level of Detail

The Contractor's 533 reports shall contain a summary of total contract costs, as well as a separate 533 sheet for each Task Order. The reports shall contain a breakdown of each area by element of cost, i.e. direct labor hours/dollars (by category), overhead, general & administrative (G&A), travel, equipment, material, and other direct costs.

The government reserves the right to require a lower level of 533 reporting for particular task orders on a case by case basis as specified by the Contracting Officer. The purpose of this is to allow the government to separate costs on task orders that support multiple WBS elements on in-house instruments and/or missions.

b. Distribution

The Contractor shall distribute 533 reports to each addressee indicated in the Basic Contract Clause G.1 FINANCIAL MANAGEMENT REPORTING. These reports shall be distributed no later than the fifteenth (15) calendar day following the month being reported.

c. Reporting Requirements

Each report shall provide cost data for reporting categories presented below:

Direct Labor Hours

Onsite

(List applicable labor categories)

Offsite

(List applicable labor categories)

Direct Labor Dollars

Onsite

(List according to applicable labor categories)

Offsite

(List according to applicable labor categories)

ATTACHMENT C
Contract NNG07CA22C

Total Direct Labor Hours On-site
Total Direct Labor Hours Off-site
Total Prime's Hours
Teaming Subcontractor Hours
Subcontractor Hours
Total Labor Hours

Total Direct Labor Onsite
Total Direct Labor Offsite

Total Onsite Overhead
Total Offsite Overhead
Total Overhead Prime
Other Direct Costs
 Material
 Subcontractors
 Travel
 Miscellaneous
 Total ODC's

Subtotal (Direct Cost plus Overhead)

G&A Expense

Total Cost

Award Fee

Total Cost Plus Award Fee (CPAF)

The 533 for each task order shall report direct labor hours by category.

d. Other Special Reports

The Contractor shall submit, as required, special cost or manpower reports either in the areas of actuals, projections or both. These reports may take the form of labor, overhead, other direct charges, billing analyses or other business information. When required, specific instructions will be provided by the Contracting Officer.

ATTACHMENT C
Contract NNG07CA22C

e. Additional Requirements

1. Before the summary 533 sheet, the Contractor shall submit a financial summary containing a one-line summary for all tasks on the contracts. It shall include the following columns:

Task Number
Status
Cumulative to Date Actual \$
Cumulative to Date Actual \$ Plus Month 1 planned \$
Contractor Estimate \$
Cumulative to Date Planned Hours
Cumulative to Date Actual On-site Hours
Cumulative to Date Actual Off-site Hours (Including Subs)

2. In addition to the hardcopy of the summary sheet, the Contractor shall provide the summary sheet in an e-mail file or on a CD as a comma-delimited text file. Below are the requirements:

The contractor cost data for import into the CORTS2 application will come from the contractor as a comma-delimited text file. The file should be saved as the name of ContractorCost.txt. The lay out of the import file is shown in the table below.

Only one contract can be included in one import file.

The contractor cost data can be loaded from the file either in the CORTS2 director of the C drive or in the CD Drive (E:\)

Two types of data will be included in the import file: column title and column data.

Column titles must be provided in the first row for each data column in the import file. The name and order of each column title must be exactly the same as illustrated in the "Column Title in File" column in the table below, with a comma as a delimiter. Please note that the data for the Contract Number and Task Number must be within double quotes to indicate that they are text data. In the event of no data, enter the default data as specified in the table.

Two tables will be updated in CORTS2: Task Summary and Task Information.

The Report Ending Date is in the MM/YYYY format and must be the previous month of the current import date. If it's not, no data will be imported into CORTS2.

When task number exists, the task will be treated as an existing task and the associated task summary amount fields will be overwritten with the corresponding amounts in the import file. The prorated rules will then be applied to all task detail records. Please see the attached Import Scenarios for detail.

ATTACHMENT C
Contract NNG07CA22C

When a task number does not exist, a new task summary record and associated task detail record will be created as described in the Import Scenarios as attached.

No deletion will be performed in this process.

Data Element Name	Column Title In File	Type	Size	Value (0-optional, 9-	Mandatory	Default	Comments
Report Ending Date	ReportDate	Text	7	99/9999	Yes		Must be the previous month of the current import date.
Contract Number	ContractNo	Text	5	99999	Yes		
Task Number	TaskNumber	Text	7	0009.0	Yes		
Cumulative Cost	CumCost	Integer	9	000000000	No	0	
Accrued Cost	AccruedCost	Integer	9	000000000	No	0	
Cost Estimate	CostEstimate	Integer	9	000000000	No	0	
Hours Estimated	EstHours	Integer	9	000000000	No	0	
On Site Hours	OnSiteHours	Integer	9	000000000	No	0	
Off Site Hours	OffSiteHours	Integer	9	000000000	No	0	

The contractor will use the Task Order Management System (TOMS) for submitting individual task Contractor Task Plans in PDF format and possibly individual task 533's in the future.

**DEPARTMENT OF DEFENSE
CONTRACT SECURITY CLASSIFICATION SPECIFICATION**
(The requirements of the DoD Industrial Security Manual apply)

1. CLEARANCE AND SAFEGUARDING

a. FACILITY CLEARANCE REQUIRED

Secret

b. LEVEL OF SAFEGUARDING REQUIRED

None

2. THIS SPECIFICATION IS FOR: (X and complete as applicable) **3. THIS SPECIFICATION IS: (X and complete as applicable)**

X	a. PRIME CONTRACT NUMBER	NNG07CA22C		X	a. ORIGINAL (Complete date in all cases)	Date (YYMMDD)
	b. SUBCONTRACT NUMBER				b. REVISED (Supersedes all previous specs)	Revision No. Date (YYMMDD)
	c. SOLICITATION OR OTHER	Due Date (YYMMDD)			FINAL (Complete Item 5 in all cases)	Date (YYMMDD)

4. IS THIS A FOLLOW-ON CONTRACT? YES NO NO. If Yes, complete the following:
Classified material received or generated under _____ (Preceding Contract Number) are transferred to this follow-on contract.

5. IS THIS A FINAL DD FORM 254? YES NO NO. If Yes, complete the following:
In response to the contractor's request dated _____, retention of the classified material is authorized for the period _____

6. CONTRACTOR (Include Commercial and Government Entity (CAGE) Code)

a. NAME, ADDRESS, AND ZIP CODE	b. CAGE	c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip)
Bastion Technologies, Inc. 17625 El Camino Real, Suite 330 Houston, Texas 77058	1PM71	Defense Security Service

7. SUBCONTRACTOR

a. NAME, ADDRESS, AND ZIP CODE	b. CAGE	c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip)
Orbital Sciences Corporation 5011 Herzel Place Beltsville, MD 20705		

8. ACTUAL PERFORMANCE

a. LOCATION	b. CAGE	c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip)
17625 El Camino Real, Suite 330 Houston, TX 77058		

9. GENERAL IDENTIFICATION OF THIS PROCUREMENT
Mechanical Systems Engineering Services (MSES II/B) provides mechanical systems and engineering services and technology development in order to design, analyze, fabricate, integrate, test and launch advanced scientific instruments for GSFC spacecraft programs.

10. CONTRACTOR WILL REQUIRE ACCESS TO:	YES	NO	11. IN PERFORMING THIS CONTRACT, THE CONTRACTOR	YES	NO
a. COMMUNICATIONS SECURITY (COMSEC) INFORMATION	X		a. HAVE ACCESS TO CLASSIFIED INFORMATION ONLY AT ANOTHER CONTRACTOR'S FACILITY OR A GOVERNMENT ACTIVITY	X	
b. RESTRICTED DATA		X	b. RECEIVE CLASSIFIED DOCUMENTS ONLY		X
c. CRITICAL NUCLEAR WEAPON DESIGN INFORMATION		X	c. RECEIVE AND GENERATE CLASSIFIED MATERIAL		X
d. FORMERLY RESTRICTED DATA		X	d. FABRICATE, MODIFY, OR STORE CLASSIFIED HARDWARE		X
e. INTELLIGENCE INFORMATION			e. PERFORM SERVICES ONLY		X
(1) Sensitive Compartmented Information (SCI)		X	f. HAVE ACCESS TO U.S. CLASSIFIED INFORMATION OUTSIDE THE U.S., PUERTO RICO, U.S. POSSESSIONS AND TRUST TERRITORIES		X
(2) Non-SCI		X	g. BE AUTHORIZED TO USE THE SERVICES OF DEFENSE TECHNICAL INFORMATION CENTER (DTIC) OR OTHER SECONDARY DISTRIBUTION CENTER		X
f. SPECIAL ACCESS INFORMATION		X	h. REQUIRE A COMSEC ACCOUNT		X
g. NATO INFORMATION		X	i. HAVE TEMPEST REQUIREMENTS		X
h. FOREIGN GOVERNMENT INFORMATION		X	j. HAVE OPERATIONS SECURITY (OPSEC) REQUIREMENTS		X
i. LIMITED DISSEMINATION INFORMATION		X	k. BE AUTHORIZED TO USE THE DEFENSE COURIER SERVICE		X
j. FOR OFFICIAL USE ONLY INFORMATION	X		l. OTHER (Specify)		
k. OTHER (Specify)					

12. PUBLIC RELEASE Any information (classified or unclassified) pertaining to this contract shall not be released for public dissemination except as provided by the Industrial Security Manual unless it has been approved for public release by appropriate U.S. Government authority. Proposed public releases shall be submitted for approval prior to release

Direct Through (Specify)

NASA/GODDARD SPACE FLIGHT CENTER 130/PUBLIC AFFAIRS OFFICE GREENBELT, MD 20771

CC To the Public Affairs Division, NASA Headquarters, Washington, D.C. 20546 for review.

13. SECURITY GUIDANCE. The security classification guidance needed for this classified effort is identified below. If any difficulty is encountered in applying this guidance or if any other contributing factor indicates a need for changes in this guidance, the contractor is authorized and encouraged to provide recommended changes; to challenge the guidance or the classification assigned to any information or material furnished or generated under

In performance of this contract, some personnel may require access to classified information up to and including the SECRET level. The contract must have a sufficient number of cleared employees assigned duties under this contract to be able to complete all classified work assignments up to and including SECRET.

1. DoD 5220.22-M National Industrial Security Program Operating Manual (NISPOM)
2. DoD 5220.22-M COMSEC Annex to the NISPOM (Coordination Copy)
3. NCSC-1 – National Policy for Safeguard and Control of COMSEC Material Communications Security Classification Guide, 1/8/87
4. NASA Space Network Security Classification Guide, 9/16/96 (currently under revision)
5. GHB 1600.1A GSFC Security Manual (and all subsequent revisions)
6. NPR 1600.1, NASA Security Program Procedural Requirements w/Change 1, 11/8/05
7. NPD 1600.2D, NASA Security Policy Revalidated 2/1/06
8. NPD 1660.1, NASA Counterintelligence (CI) Policy 2/27/02
9. NPR 1660.1, NASA Counterintelligence (CI)/Counterterrorism (CT) Procedural Requirements 12/21/04
10. NPR 2810.1, NASA Security of Information Technology, Revalidated 8/12/04
11. NPD 2810.1C, NASA Information Security Policy 4/7/04
12. OMB Circular A.130 Appendix III, Security of Federal Automated Information Resources
13. Computer Security Act of 1987, as amended

10.a. Access to COMSEC information will take place at the Goddard Space Flight Center.

14. ADDITIONAL SECURITY REQUIREMENTS. Requirements, in addition to ISM requirements, are established for this contract. (If Yes, identify the pertinent contractual clauses in the contract document itself, or provide an appropriate statement which identifies the additional requirements. Provide a copy of the requirements to the cognizant security office. Use Item 13 if additional space is needed.) Yes No

15. INSPECTIONS. Elements of this contract are outside the inspection responsibility of the cognizant security office. (If Yes, explain and identify specific areas or elements carved out and the activity responsible for inspections. Use Item 13 if additional space is needed.) Yes No

16. CERTIFICATION AND SIGNATURE. Security requirements stated herein are complete and adequate for safeguarding the classified information to be released or generated under this classified effort. All questions shall be referred to the official named below.

<p>a. TYPED NAME OF CERTIFYING OFFICIAL Pamela A. Starling</p>	<p>b. TITLE Industrial Security Specialist</p>	<p>c. TELEPHONE (Include Area Code) 301-286-6865</p>
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<p>d. ADDRESS (Include Zip Code) NASA Goddard Space Flight Center Code 240 Greenbelt, MD 20771</p>	<p>17. REQUIRED DISTRIBUTION</p> <table style="width: 100%;"> <tr><td><input checked="" type="checkbox"/></td><td>a. CONTRACTOR</td></tr> <tr><td><input checked="" type="checkbox"/></td><td>b. SUBCONTRACTOR</td></tr> <tr><td><input checked="" type="checkbox"/></td><td>c. COGNIZANT SECURITY OFFICE FOR PRIME AND SUBCONTRACTOR</td></tr> <tr><td><input type="checkbox"/></td><td>d. U.S. ACTIVITY RESPONSIBLE FOR OVERSEAS SECURITY ADMINISTRATION</td></tr> <tr><td><input checked="" type="checkbox"/></td><td>e. ADMINISTRATIVE CONTRACTING OFFICER</td></tr> <tr><td><input checked="" type="checkbox"/></td><td>f. OTHERS AS NECESSARY NASA Headquarters, Code OSPP</td></tr> </table>	<input checked="" type="checkbox"/>	a. CONTRACTOR	<input checked="" type="checkbox"/>	b. SUBCONTRACTOR	<input checked="" type="checkbox"/>	c. COGNIZANT SECURITY OFFICE FOR PRIME AND SUBCONTRACTOR	<input type="checkbox"/>	d. U.S. ACTIVITY RESPONSIBLE FOR OVERSEAS SECURITY ADMINISTRATION	<input checked="" type="checkbox"/>	e. ADMINISTRATIVE CONTRACTING OFFICER	<input checked="" type="checkbox"/>	f. OTHERS AS NECESSARY NASA Headquarters, Code OSPP
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<input checked="" type="checkbox"/>	e. ADMINISTRATIVE CONTRACTING OFFICER												
<input checked="" type="checkbox"/>	f. OTHERS AS NECESSARY NASA Headquarters, Code OSPP												
<p>e. SIGNATURE</p>													

Any employee, who observes or becomes aware of the deliberate or suspected compromise of classified national security information, shall promptly report such information personally to the GSFC Counterintelligence (CI) Office. If sensitive but unclassified (SBU) information appears compromised by or on behalf of foreign or domestic powers, organizations or persons, employees shall report such information to the GSFC CI Office. If an employee becomes aware of information pertaining to international or domestic terrorist activities, employees shall also report to the GSFC CI Office. If the information indicates a computer compromise or other cyber intrusion, the Office of Inspector General shall be promptly notified.

PIV Card Issuance Procedures in accordance with FAR clause 52.204-9, Personal Identity Verification of Contractor Personnel

FIPS 201 Appendix A graphically displays the following procedure for the issuance of a PIV credential.

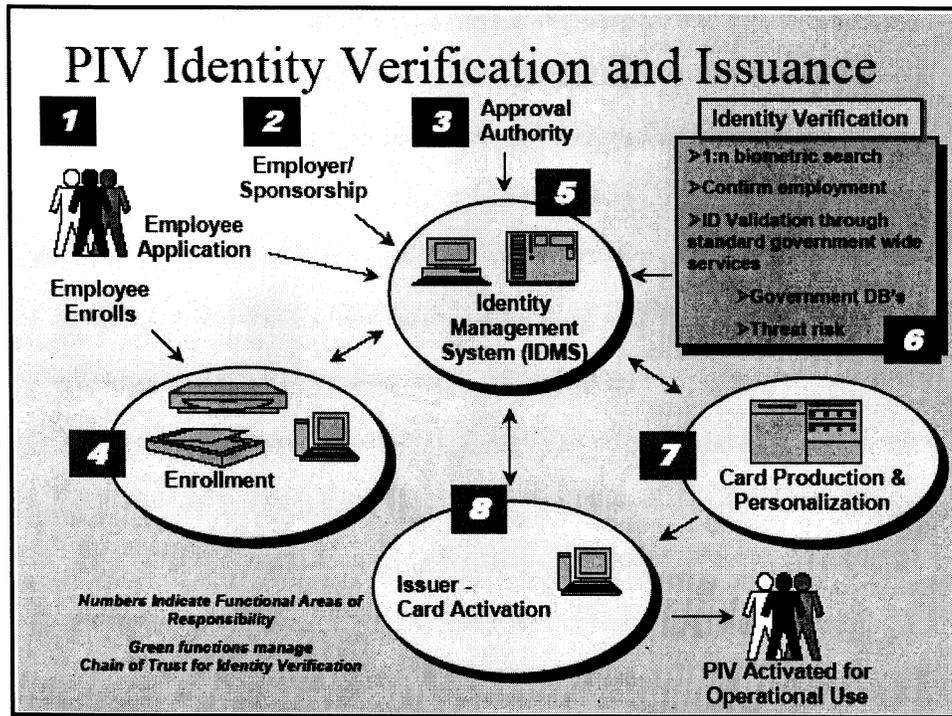


Figure A-1, FIPS 201, Appendix A

The following steps describe the procedures for the NASA Personal Identity Verification Card Issuance (PCI) of a PIV credential:

Step 1:

The Contractor's Corporate Security Officer (CSO), Program Manager (PM), or Facility Security Officer (FSO) submits a formal letter that provides a list of contract employees (applicant) names requesting access to the NASA Contracting Officer's Technical Representative (COTR). In the case of a foreign national applicant, approval through the NASA Foreign National Management System (NFMMS) must be obtained for the visit or assignment before any processing for a PIV credential can take place. Further, if the foreign national is not under a contract where a COTR has been officially designated, the foreign national will provide the information directly to their visit/assignment host, and the host sponsor will fulfill the duties of the COTR mentioned herein. In each case, the letter shall provide notification of the contract or foreign national employee's (hereafter the "applicant") full name (first, middle and last), social security number (SSN) or NASA Foreign National Management System Visitor Number if the foreign national does not have a SSN, and date of birth. If the contract employee has a current satisfactorily completed National Agency Check with Inquiries (NACI) or an equivalent or higher

degree of background investigation, the letter shall indicate the type of investigation, the agency completing the investigation, and date the investigation was completed. Also, the letter must specify the risk/sensitivity level associated with the position in which each applicant will be working (NPR 1600.1, §4.5 is germane) Further, the letter shall also acknowledge that contract employees may be denied access to NASA information or information systems based on an unsatisfactory background investigation/adjudication. .

After reviewing the letter for completeness and concurring with the risk/sensitivity levels, the COTR/host must forward the letter to the Center Chief of Security (CCS). The CCS shall review the OPM databases (e.g., DCII, PIP, et al.), and take appropriate steps to validate the applicant's investigation status. Requirements for a NACI or other investigation shall be initiated only if necessary.

Applicants who do not currently possess the required level of background investigation shall be directed to the e-QIP web site to complete the necessary background investigation forms online. The CCS shall provide to the COTR/host information and instructions on how to access the e-QIP for each contract or foreign national employee requiring access

Step 2:

Upon acceptance of the letter/background information, the applicant will be advised that in order to complete the investigative process, he or she must appear in-person before the authorized PIV registrar and submit two forms of identity source documents in original form. The identity source documents must come from the list of acceptable documents included in Form I-9, Employment Eligibility Verification, one which must be a Federal¹ or State issued picture identification. Fingerprints will be taken at this time. The applicant must appear **no later than** the entry on duty date.

When the applicant appears, the registrar will electronically scan the submitted documents; any document that appears invalid will be rejected by the registrar. The registrar will capture electronically both a facial image and fingerprints of the applicant. The information submitted by the applicant will be used to create or update the applicant identity record in the Identity Management System (IDMS).

Step 3:

Upon the applicant's completion of the investigative document, the CCS reviews the information, and resolves discrepancies with the applicant as necessary. When the applicant has appeared in person and completed fingerprints, the package is electronically submitted to initiate the NACI. The CCS includes a request for feedback on the NAC portion of the NACI at the time the request is submitted.

Step 4:

¹ A non-PIV government identification badge, including the NASA Photo Identification Badge, MAY NOT BE USED for the original issuance of a PIV vetted credential

Attachment I
NNG07CA22C

Prior to authorizing physical access of a contractor employee to a federally-controlled facility or access to a Federal information system, the CCS will ensure that a check has been performed with the National Crime Information Center (NCIC) and Interstate Identification Index. In the case of a foreign national, a national check of the Bureau of Immigration and Customs Enforcement (BICE) database will be performed for each applicant. If this process yields negative information, the CCS will immediately notify the COTR/host of the determination regarding access made by the CCS.

Step 5:

Upon receipt of the completed NAC, the CCS will update IDMS from the NAC portion of the NACI and indicate the result of the suitability determination. If an unsatisfactory suitability determination is rendered, the COTR will advise the contractor that the employee is being denied physical access to all federally-controlled facilities and Federal information systems.

Based on a favorable NAC and NCIC/III or BICE check, the CCS will authorize the issuance of a PIV federal credential in the Physical Access Control System (PACS) database. The CCS, based on information provided by the COTR/host, will determine what physical access the applicant should be granted once the PIV issues the credential.

Step 6:

Using the information provided by the applicant during his or her in-person appearance, the PIV card production facility creates and instantiates the approved PIV card for the applicant with an activation date commensurate with the applicant's start date.

Step 7:

The applicant proceeds to the credential issuance facility to begin processing for receipt of his/her federal credential.

The applicant provides to the credential issuing operator proof of identity with documentation that meets the requirements of FIPS 201 (DHS Employment Eligibility Verification (Form I-9) documents. These documents **must** be the same documents submitted for registration.

The credential issuing operator will verify that the facial image, and optionally reference finger print, matches the enrollment data used to produce the card. Upon verification of identity, the operator will locate the employee's record in the PACS database, and modify the record to indicate the PIV card has been issued. The applicant will select a PIN for use with his or her new PIV card. Although root data is inaccessible to the operator, certain fields (hair color, eye color, et al.) may be modified to more accurately record the employee's information.

The applicant proceeds to a kiosk or other workstation to complete activation of the PIV card using the initial PIN entered at card issuance.

**ALTERNATIVE FOR APPLICANTS WHO DO NOT HAVE A COMPLETED
AND ADJUDICATED NAC AT THE TIME OF ENTRANCE ON DUTY**

Steps 1 through 4 shall be accomplished for all applicants in accordance with the process described above. If the applicant is unable to appear in person until the time of entry on duty, or does not, for any other reason, have a completed and adjudicated NAC portion of the NACI at the time of entrance on duty, the following interim procedures shall apply.

1. If the documents required to submit the NACI have not been completed prior to EOD, the applicant will be instructed to complete all remaining requirements for submission of the investigation request. This includes presentation of I-9 documents and completion of fingerprints, if not already accomplished. If the applicant fails to complete these activities as prescribed in NPR 1600.1 (Chapters 3 & 4), it may be considered as failure to meet the conditions required for physical access to a federally-controlled facility or access to a Federal information system, and result in denial of such access.
2. Based on favorable results of the NCIC, the applicant shall be issued a temporary NASA identification card for a period not-to-exceed six months. If at the end of the six month period the NAC results have not been returned, the agency will at that time make a determination if an additional extension will be granted for the temporary identification card.
3. Upon return of the completed NAC, the process will continue from Step 5.