SOLICITATION, OFFER AND AWARD	1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350) ➤	RATING D0-C9	PAGE 1 OF 247

2. CONTRACT NO.	3. SOLICITATION NO.	4. TYPE OF SOLICITATION	5. DATE ISSUED	6. REQUISITION/PURCHASE` NO.
NNM08AA20C	**NNM08125357R**	☐ SEALED BID (IFB) ☒ NEGOTIATED (RFP)	**January 4, 2008**	**4200201895**

7. ISSUED BY	CODE	MDP	8. ADDRESS OFFER TO *(If other than Item 7)*
National Aeronautics & Space Administration **George C. Marshall Space Flight Center** **Procurement Office** **Marshall Space Flight Center, AL 35812**			NASA/Marshall Space Flight Center Attn: PS21/Kimberly S. Carson Marshall Space Flight Center, AL 35812 Deliver to: Building 4203 Room B109 (256) 961-2035 or (256) 544-0609

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

SOLICITATION

9. Sealed offers in original and **(see Request for Final Proposal Revision letter dated 1/4/07)** copies for furnishing the supplies or services in the Schedule will be received at the place specified in Item 8, or if hand carried, in the depository located in **Building 4203 Basement, Elevator Lobby Area** until **5:00 pm** local time, on **January 9, 2008.** CAUTION - LATE Submissions, Modifications, and Withdrawals: See Section L, Provision No. 52.214-7 or 52.215-1. All offers are subject to all terms and conditions contained in this solicitation.

10. FOR INFORMATION CALL: ➤	A. NAME	B. TELEPHONE NO. *(NO COLLECT CALLS)* AREA CODE	NUMBER	EXT.	C. EMAIL ADDRESS
	Kimberly S. Carson	**(256)**	**544-0609**	**N/A**	**Kimberly.S.Carson@nasa.gov**

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OFFER *(Must be fully completed by offeror)*

NOTE: Item 12 does not apply if the solicitation includes the provisions at 52.214-16, Minimum Bid Acceptance Period.

12. In compliance with the above, the undersigned agrees, if this offer is accepted within 120 calendar days *(60 calendar days unless a different period is inserted by the offeror)* from the date for receipt of offers specified above, to furnish any or all items upon which prices are offered at the price set opposite each item, delivered at the designated point(s), within the time specified in the schedule.

13. DISCOUNT FOR PROMPT PAYMENT ➤ *(See Section I, clause No. 52-232-8)*	10 CALENDAR DAYS %	20 CALENDAR DAYS %	30 CALENDAR DAYS %	CALENDAR DAYS %

14. ACKNOWLEDGMENT OF AMENDMENTS *(The offeror acknowledges receipt of amendments to the SOLICITATION).*	AMENDMENT NO	DATE	AMENDMENT NO	DATE
	001	31 Aug 2007		
For offerors and related documents numbered and dated:				

15. NAME AND ADDRESS OF OFFEROR	CODE 0AFL2	FACILITY	16. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)*
InfoPro Corporation 202 Exchange Place NW Huntsville, AL 35806			**William R. Longshore, COO / Sr Vice President**

15B. TELEPHONE NO. *(Include area code)*	15C. CHECK IF REMITTANCE ADDRESS IS DIFFERENT FROM ABOVE – ENTER SUCH ADDRESS IN SCHEDULE	17. SIGNATURE	18. OFFER DATE
256-722-9090	☐	/s/ Original Signed by William R. Longshore	9 Jan 2008

AWARD *(To be completed by Government)*

19. ACCEPTED AS TO ITEMS NUMBERED	20. AMOUNT	21. ACCOUNTING AND APPROPRIATION
	$7,550,033.00	See Page A-1

22. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION	23. SUBMIT INVOICES TO ADDRESS SHOWN IN: ➤ *(4 copies unless otherwise specified)*	ITEM
☐ 10 U.S.C. 2304(c) ( ) ☐ 41 U.S.C. 253(c) ( )		Clause G.2

24. ADMINISTERED BY *(If other than Item 7)* CODE	25. PAYMENT WILL BE MADE BY CODE

26. NAME OF CONTRACTING OFFICER *(Type or print)*	27. UNITED STATES OF AMERICA /s/ Original Signed by Kim E. Whitson *(Signature of Contracting Officer)*	28. AWARD DATE
		02/12/2008

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

PART I – THE SCHEDULE

SECTION A

SOLICITATION/CONTRACT FORM

A.1 STANDARD FORM 33 (see previous page)

A.2 CONTINUATION OF STD. FORM 33 DATA (MSFC 52.204-92) (FEB 2001)

Accounting and Appropriation Data:

PR Number	Fund	Fund Center – WBS Element	Cost Center	Amount
4200237468	EXCX22008D	520871.08.01.01.02	62EM03	$31,000
	EXCX22008D	524238.08.01.01.03	62EM10	118,000
	EXCX22008D	522094.08.01.01.03.0	62EM10	14,000
	EXCX22008D	750271.09.02.08	62EM10	21,600
	EXCX22008D	401769.06.03.07.02.0	62EM10	53,000
	EXCX22008D	524238.08.01.01.03	62EM40	15,000
	EXCX22008D	520871.08.01.01.02	62EM40	60,000
	ESAX22008D	526282.01.08.16	62EM10	300,000
	EXCX22008D	524238.08.01.01.03	62EM50	25,000
	ESAX22008D	411672.06.05.01	62EM50	123,388
	EXCX22007R	892182.01.08.06.0702	62EM50	19,000
	EXCX22007R	892182.01.08.07.071B	62EM50	4,316
	EXCX22008D	401769.06.03.07.02.0	62EM50	135,000
	ESAX22008D	136905.08.05.06.01.0	62EM40	517
	ESAX22008D	136905.08.05.12.02.0	62EV35	130,274
	ESAX22008D	136905.08.05.12.02.0	62EM10	40,770
	EXCX22008D	401769.06.03.07.02.0	62ES23	7,492
	EXCX22008D	401769.06.08.02.04.0	62ES23	122,340
	ESAX22008D	526282.01.08.19	62ES23	188,000
	ESAX22008D	526282.01.08.19	62ES23	50,000
			TOTAL	**$1,458,697**

(End of clause)

PART I - THE SCHEDULE

SECTION B - SUPPLIES OR SERVICES AND PRICE/COSTS

B.1 SERVICES TO BE FURNISHED AND TYPE OF CONTRACT

(a) The Contractor shall provide all resources (except as expressly stated in the contract as furnished by the Government) necessary to furnish the services delineated in the Performance Work Statement (PWS) in Attachment J-1, entitled: "Marshall Engineering Technicians and Trades Support (METTS) Services."

(b) The services will be procured under two separate portions, Mission Services (MS) and Indefinite Delivery/Indefinite Quantity (IDIQ). The requirement is being procured on a cost-plus-award-fee basis. The contract and supporting data are organized as shown below:

(1) The Mission Services portion covers work identified in 1.0 – 2.0 of the PWS. Project management and administrative resources necessary to manage both the Mission and the IDIQ contract portions are covered in the Mission Services.

(2) IDIQ task orders will be used to procure those services identified in WBS 3.0 of the PWS that cannot be predetermined or quantified in advance.

(End of Clause)

B.2 1852.216-85 ESTIMATED COST AND AWARD FEE (SEP 1993)

(a) The total estimated cost of this contract is $ [See Table B-1 below]. The total award fee for this contract is $ [See Table B-1 below].

(b) The amount of award fee earned as identified in this clause, paragraph (c), is common fee to be shared between the Contractor and its teammate/major subcontractor ERC. The amounts shown by evaluation period in this clause, paragraph (c) are the maximum award fees allowed the Contractor and identified subcontractors.

(c) Table B-1 reflects the contract values of individual contract line items (CLINs) and is set forth below:

TABLE B-1, ESTIMATED COST AND AWARD FEE (AF)

(b)(4)

(d) If the Government exercises any of its Options pursuant to the terms of the contract, the estimated costs and fees for each Mission Services CLIN shall be as set forth in Table B-2 below.

(b)(4)

B.3 INDEFINITE DELIVERY/INDEFINITE QUANTITY (IDIQ)

(a) The IDIQ portion of this contract is only applicable to the work described in Attachment J-1, PWS 3.0, Indefinite Delivery/Indefinite Quantity (IDIQ). This work will be authorized via Task Orders (TO) issued by the Contracting Officer (CO) in accordance with Clauses H.4, H.5, and H.6.

(b) This clause establishes the minimum and maximum quantity values including cost and award fees for each IDIQ CLIN of the contract as set forth in Table B-3 below.

TABLE B-3 IDIQ MINIMUM AND MAXIMUM VALUES

IDIQ CLIN	CONTRACT PERIOD	MINIMUM QUANTITY	MAXIMUM QUANTITY
1	Base (Year 1)	$0.00	$ 17,700,000
2	Option 1 (Year 2)	$0.00	$ 22,400,000
3	Option 2 (Year 3)	$0.00	$ 32,200,000
4	Option 3 (Year 4)	$0.00	$ 36,900,000
5	Option 4 (Year 5)	$0.00	$ 41,600,000

(c) Government task orders for services specified above the minimum and below the maximum shall not constitute a basis for equitable adjustments to the Mission Services CLINs.

(d) The establishment of this IDIQ portion of the contract does not inhibit the Government's right to later award separate contracts for similar or related services.

(e) The actual estimated cost and fee values of the individual CLINs will be the summation of the individual task orders values issued pursuant to this Clause and Clauses H.2 and H.3. A reconciling unilateral modification to the contract will be periodically issued that reflects the current task order summation value in Clause B.2.

(End of Clause)

B.4 1852.216-76 AWARD FEE FOR SERVICE CONTRACTS (JUN 2000)

(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 MSFC Award Fee Evaluation Plan (An internal Government document to be provided to the Contractor within 30 days after Contract award, along with Areas of Emphasis). The Government's Award Fee 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 payment office designated in Clause G.2, Submission of Vouchers for Payment, will make payment based on issuance of a unilateral modification by the Contracting Officer.

(d) After 85 percent 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 Clause B.2, Estimated Cost and Award Fee. 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. 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 70 percent 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 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 not 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)

B.5 1852.232-81 CONTRACT FUNDING (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 the Marshall Engineering Technicians and Trades Support Services and covers the following estimated period of performance: Contract Award through TBD.

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

	Previous	This Action	Total
Estimated Cost:	(b)(4)		
Provisional Award Fee:			
Earned Award Fee:			
Total Sum Allotted:	$ 0	$ 1,504,255	$ 1,504,255

(End of Clause)

B.6 MSFC 52.222-90 PREMIUMS FOR SCHEDULED OVERTIME (FEB 2001)

Pursuant to the clause entitled "Payment for Overtime Premiums," the amount of overtime premium authorized shall not exceed the amount specified below for the indicated period:

t	Period
(b)(4)	Base Period
	Option 1
	Option 2
	Option 3
	Option 4

Note 1 - Overtime premium is defined herein as any payment (for both exempt and non-exempt employees) for time worked exceeding forty hours per week (alternate work schedules will be considered by NASA on a WBS basis). A work week of forty-one hours includes one hour of overtime premium, whether the employee was paid at time-and-a-half, straight time, compensatory time, or as an offset of an earlier thirty-nine hour work week (unless an alternate work schedule has been approved by NASA).

Note 2 - All overtime shall be coordinated with, and concurred in, by the COTR prior to work commencing.

(End of Clause)

B.7 ALLOWABLE ITEMS OF COST (MSFC 52.242-90) (FEB 2001)

(a) In accordance with the advance agreement between the Government and the Contractor for this contract, allowable costs for the items listed below are subject to the ceilings shown:

General and Administrative (G&A) Rate Ceiling (applicable to Mission and IDIQ portions):

(b)(4)	

(b) It is mutually agreed that when indirect cost rate ceilings are specified, the following conditions shall apply: (1) the Government shall not be obligated to pay any additional amount should the final indirect cost rates exceed the negotiated ceiling rates, and (2) in the event the final indirect cost rates are less than the negotiated ceiling rates, the negotiated rates shall be reduced to conform with the lower rates.

(End of Clause)

[END OF SECTION]

SECTION C - DESCRIPTION/SPECIFICATION/WORK STATEMENT

C.1 MSFC 52.211-93 DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK (FEB 2001)

The Description/Specifications/Statement of Work is Attachment J-1, Performance Work Statement (PWS).

(End of Clause)

C.2 EXCLUDED FUNCTIONS AND RESPONSIBILITIES

Functions and responsibilities directly involved or associated with the management of any MSFC Directorate, Office or Laboratory are expressly excluded from this contract. Any instructions, directives, or orders issued under this contract involving such MSFC management functions and responsibilities shall be null and void. The following activities are representative of the excluded functions and responsibilities that cannot be provided by the Contractor for the Government:

- Policy making or management of MSFC operations;
- Program or project management;
- Technical management of Government contracts;
- MSFC management planning, programming (including preparation of scopes of work and/or procurement requests for items to be contracted for by MSFC), budgeting, review, and analysis;
- Government purchasing, contracting, contract administration, and/or performance, and pay and accounting;
- Direction or supervision of other Government Contractors or Government agencies, or otherwise acting as an agent to obligate or commit MSFC in any capacity;
- Clerical and other administration-type functions required to be performed by civil service personnel; and
- Supervision of Government employees.

(End of clause)

[END OF SECTION]

SECTION D - PACKAGING AND MARKING

D.1 LISTING OF CLAUSES INCORPORATED BY REFERENCE

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)

Clause Number	Title	Date

None included by reference.

II. NASA FAR SUPPLEMENT (48 CFR CHAPTER 18) CLAUSES

Clause Number	Title	Date
1852.211-70	Packaging, Handling, and Transportation	SEP 2005

(End of Clause)

[END OF SECTION]

SECTION E - INSPECTION AND ACCEPTANCE

E.1 LISTING OF CLAUSES INCORPORATED BY REFERENCE

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES

Clause Number	Title	Date
52.246-3	Inspection of Supplies – Cost Reimbursement	MAY 2001
52.246-5	Inspection of Services – Cost-Reimbursement	APR 1984

II. NASA FAR SUPPLEMENT (48 CFR CHAPTER 18) CLAUSES

Clause Number	Title	Date
None included by reference		

(End of Clause)

E.2 1852.246-71 GOVERNMENT CONTRACT QUALITY ASSURANCE FUNCTIONS (OCT 1988)

In accordance with the inspection clause of this contract, the Government intends to perform the following functions at the locations indicated:

Item	Quality Assurance Function	Location
All	Final Inspection and Acceptance	MSFC, AL
Task Order Basis	NASA MSFC Safety & Mission Assurance Surveillance Plan (See Attachment J-20)	MSFC, AL

(End of Clause)

E.3 HIGHER-LEVEL CONTRACT QUALITY REQUIREMENT (FAR 52.246-11) (FEB 1999)

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

	Title	Number	Date
☒	Marshall Management Manual	MPD 1280.1	Latest issue

(End of Clause)

E.4 CHANGES TO HIGHER-LEVEL CONTRACT QUALITY REQUIREMENTS

It is mutually agreed and understood that the Government may unilaterally update Clause E.3 with future versions and require full compliance to the latest requirements. Such action shall not give rise to an equitable adjustment to the estimated contract value, including both cost and award fees, or any other expressed terms and conditions of this contract.

(End of Clause)

[END OF SECTION]

SECTION F - DELIVERIES OR PERFORMANCE

F.1 LISTING OF CLAUSES INCORPORATED BY REFERENCE

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)

Clause Number	Title	Date
52.242-15	Stop-Work Order (Alternate I)	APR 1984
52.247-34	FOB Destination	NOV 1991

II. NASA FAR SUPPLEMENT (48 CFR CHAPTER 18) CLAUSES

Clause Number	Title	Date
None included by reference.		

(End of Clause)

F.2 PERIOD OF PERFORMANCE

(a) The period of performance of this contract shall be March 1, 2008 through February 28, 2009. If applicable, the contract phase-in period shall be from February 11, 2008 through no later than February 29, 2008.

(b) In the event the Government elects to exercise its option(s) pursuant to the terms of this contract, the period of performance for each option shall be as set forth below:

Contract Periods	Period of Performance
Option 1	March 1, 2009 – February 28, 2010
Option 2	March 1, 2010 – February 28, 2011
Option 3	March 1, 2011 – February 29, 2012
Option 4	March 1, 2012 – February 28, 2013

F.3 MSFC 52.237-91 PLACE OF PERFORMANCE (FEB 2001)

The Contractor shall perform the work under this contract at George C. Marshall Space Flight Center, and at such other locations as may be approved in writing by the Contracting Officer.

(End of Clause)

F.4 52.217-9 OPTION TO EXTEND THE TERM OF THE CONTRACT (MAR 2000)

(a) The Government may extend the term of this contract by written notice to the Contractor prior to the expiration of the current period of performance provided that the Government shall give the Contractor a preliminary written notice of its intent to extend at least 30 days before the contract expires. The preliminary notice does not commit to the Government to an extension.

(b) If the Government exercises this option, the extended contract shall be considered to include this option provision.

(c) The total duration of this contract, including the exercise of any options under this clause shall not exceed 60 months.

(End of Clause)

F.5 PHASE-IN PURCHASE ORDER (PO) AND PHASE-OUT

(a) Contractor Phase-In PO

(1) The services provided by this Order are vital to the Government's overall effort. Therefore, continuity of these services must be maintained at a consistently high level without disruption. To this end, the Contractor shall conduct an orderly phase-in of contract activities prior to assumption of responsibility for the effort described in the PWS.

(2) The Contractor shall have up to 17 calendar days immediately prior to the effective date of the contract in which to conduct phase-in. Office space will not be provided by the Government during the phase-in period. During this time, the Contractor shall not be responsible for performance of the effort described in the PWS as it is understood that during phase-in the predecessor contractor(s) will be performing the work described in the PWS.

(3) On March 1, 2008, the Contractor shall assume full responsibility for the effort covered by the PWS.

(4) During phase-in the Contractor shall:

(i) Participate in meetings with the predecessor contractor(s) to identify and discuss problems or areas requiring attention during the phase-in period; and

(ii) Perform all activities described in the Contractor's phase-in plan submitted with its quotation, and all activities necessary to ensure effective transfer of all effort from the predecessor contractor(s) and readiness to assume full contract performance. As part of phase-in activities, the contractor shall provide the following: 1) Final Safety, Health and Environmental Plan; 2) Organizational Conflicts of Interest Avoidance Plan; 3) Badged Employee and Remote IT User Listing; 4) Position Risk Description for Non-NASA Employees; and 5) Qualified staff available and badged (in accordance with the Personal Identity Verification (PIV) Procedures) provided in Attachment J-18, and ready to assume performance.

(b) The total Firm-Fixed Price of the 17-day phase-in period is $ 0.00 , and is included in a separate Purchase Order.

(c) The Contractor shall invoice the Government for phase-in activities only at the completion of the Purchase Order. The Government's obligations under this contract will not commence until after the successful completion of the separate phase-in Purchase Order.

(d) Contractor Phase-out

(1) Prior to contract completion, a successor contractor(s) may be selected to perform the work requirements covered by the PWS and TOs. The Contractor shall conduct an orderly phase-out of all required activities prior to completion of this contract and assumption of

responsibility for the effort described in the PWS by a successor contractor(s). The Contractor shall remain responsible for the effort covered by the PWS and TOs during phase-out activities.

(2) Upon written notice by the Contracting Officer prior to the contract completion date, the Contractor shall conduct phase-out activities for up to 30 calendar days in accordance with FAR 52.237-3, Continuity of Services.

(End of Clause)

[END OF SECTION]

SECTION G - CONTRACT ADMINISTRATION DATA

G.1 LISTING OF CLAUSES INCORPORATED BY REFERENCE

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)

Clause Number	Title	Date
52.227-11	Patent Rights –Retention by the Contractor	JUN 1997

II. NASA FAR SUPPLEMENT (48 CFR CHAPTER 18) CLAUSES

Clause Number	Title	Date
1852.227-11	Patent Rights--Retention by the Contractor (Short Form)	
1852.227-70	New Technology	MAY 2002
1852.242-71	Travel Outside of the United States	DEC 1988
1852.242-73	NASA Contractor Financial Management	NOV 2004
1852.245-70	Contractor Requests for Government-Owned Equipment	JUL 1997

(End of Clause)

G.2 1852.216-87 SUBMISSION OF VOUCHERS FOR PAYMENT (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 should be submitted to:

NASA Shared Services Center (NSSC)
Financial Management Division (FMD) – Accounts Payable
Bldg 1111, C. Road
Stennis Space Center, MS 39529

Email: NSSC-AccountsPayable@nasa.gov
Fax: 866-209-5415

Or other designated billing office as specified in writing by the Contracting Officer. (i.e. NASA Shared Services Center, etc.)

(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 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 Standard Form (SF) 1034, SF 1035, or equivalent Contractor's attachment through the Contractor's cognizant DCAA office to the NASA paying office identified in Paragraph (b)(1)

(2) Five copies of SF 1034, SF 1035A, or equivalent Contractor's attachment to the following offices by insertion in the memorandum block of their names and addresses:

(i) Copy 1 NASA Contracting Officer
(ii) Copy 2 Auditor
(iii) Copy 3 Contractor
(iv) Copy 4 Contract administration office; and
(v) Copy 5 Project management office.

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

(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 address specified in Paragraph (b)(1). 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.3 1852.227-72 DESIGNATION OF NEW TECHNOLOGY REPRESENTATIVE AND PATENT REPRESENTATIVE (JUL 1997)

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

New Technology Representative

NASA
George C. Marshall Space Flight Center
Attn: ED03/New Technology Representative
Marshall Space Flight Center, AL 35812

Patent Representative

NASA
George C. Marshall Space Flight Center
Attn: LS01/Chief Intellectual Property Counsel
Marshall Space Flight Center, AL 35812

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

(End of Clause)

G.4 1852.242-70 TECHNICAL DIRECTION (SEP 1993)

(a) Performance of the work under this contract is subject to the written technical direction of the Contracting Officer Technical Representative (COTR), who shall be specifically appointed by the Contracting Officer in writing in accordance with NASA FAR Supplement 1842.270. "Technical direction" means a directive that approves approaches, solutions, designs, or refinements; fills in details or otherwise completes the general description of work or documentation items; shifts emphasis among work areas or tasks; or furnishes similar instruction to the Contractor. Technical direction includes requiring studies and pursuit of certain lines of inquiry regarding matters within the general tasks and requirements in Section C of this contract.

(b) The COTR does not have the authority to, and shall not, issue any instruction purporting to be technical direction that—

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

(2) Constitutes a change as defined in the changes clause;

(3) Constitutes a basis for any increase or decrease in the total estimated contract cost, the fixed fee (if any), or the time required for contract performance;

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

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

(c) All technical direction shall be issued in writing by the COTR.

(d) The Contractor shall proceed promptly with the performance of technical direction duly issued by the COTR in the manner prescribed by this clause and within the COTR's authority. If, in the Contractor's opinion, any instruction or direction by the COTR falls within any of the categories defined in paragraph (b) of this clause, the Contractor shall not proceed but shall notify the Contracting Officer in writing within 5 working days after receiving it and shall request the Contracting Officer to take action as described in this clause. Upon receiving this notification, the Contracting Officer shall either issue an appropriate contract modification within a reasonable time or advise the Contractor in writing within 30 days that the instruction or direction is—

(2) Rescinded in its entirety; or

(3) Within the requirements of the contract and does not constitute a change under the changes clause of the contract, and that the Contractor should proceed promptly with its performance.

(e) A failure of the contractor and contracting officer to agree that the instruction or direction is both within the requirements of the contract and does not constitute a change under the changes clause, or a failure to agree upon the contract action to be taken with respect to the instruction or direction, shall be subject to the Disputes clause of this contract.

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

(End of Clause)

G.5 1852.245-71 INSTALLATION-ACCOUNTABLE GOVERNMENT PROPERTY (NOV 2004)

(a) (1) 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:

(2) The Contractor shall retain responsibility for notifying the cognizant property custodians of all changes associated in status associated with installation provided property. All equipment users shall (1) report any missing or untagged (meeting the criteria for control) property to the cognizant property custodian; (2) notify the cognizant property custodian, supervisor, and the Installation Security Officer immediately if theft, damage, or loss of Government property is suspected; (3) ensure that programs and projects, or as otherwise authorized; (4) identify property not being actively used in pursuit of approved programs and projects; and (5) ensure that property is turned in to the Property Disposal Officer through the cognizant property custodian when no longer needed. Under no circumstances will the Contractor dispose of installation property.

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

(b) (1) The official accountable recordkeeping, 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 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.6 1852.245-77 LIST OF INSTALLATION-ACCOUNTABLE PROPERTY AND SERVICES (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 Attachment J-9, page J-9-1. 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: See Attachment J-9, pages J-9-2 through J-9-19.

(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.7 MSFC 52.204-90 CONTRACTOR EMPLOYEE BADGING AND EMPLOYMENT TERMINATION CLEARANCE (JUL 2006)

(a) It is anticipated that performance of the requirements of this contract will require employee access to and picture badging by the Marshall Space Flight Center. Contractor requests for badging of employees shall be by MSFC Form 1739, "MSFC Contractor Badge/Decal Application." Requests for badging shall be submitted to the appointed Contracting Officer Technical Representative or the Contracting Officer for completion and approval prior to processing by the MSFC Protective Services Department.

(b) The Contractor shall establish procedures to ensure that each badged employee is properly cleared in accordance with MSFC Form 383-1, "Contractor Employee Clearance Document," when the access is no longer needed.

(c) Requests for copies of MSFC Forms 383-1, and 1739 shall be directed to the MSFC Protective Services Department, Marshall Space Flight Center, Alabama 35812.

(End of Clause)

[END OF SECTION]

SECTION H - SPECIAL CONTRACT REQUIREMENTS

H.1 LISTING OF CLAUSES INCORPORATED BY REFERENCE

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)

CLAUSE NUMBER	TITLE	DATE

None included by reference.

II. NASA FAR SUPPLEMENT (48 CFR CHAPTER 18) CLAUSES

CLAUSE NUMBER	TITLE	DATE
1852.208-81	Restrictions On Printing And Duplicating	NOV 2004

(End of Clause)

H.2 1852.209-71 LIMITATION OF FUTURE CONTRACTING (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 is the existence of conflicting roles that might bias the Contractor's judgment (See Clause H-3)

(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 that are to be incorporated into a solicitation, the Contractor shall be ineligible to perform the work described in that solicitation as a prime or 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 to use them to compete with those other companies.

(End of Clause)

H.3 ORGANIZATIONAL CONFLICTS OF INTEREST (OCI)

(a) Pursuant to FAR 9.504, the Contracting Officer is responsible for identifying and evaluating potential Organization Conflicts of Interest early in the acquisition process and either avoiding, neutralizing, or mitigating such conflicts before contract award. The

Offeror's/Teammates'/Subcontractors' attention is invited to this subpart and shall comply with these restrictions.

(b) The Contracting Officer has determined that during the performance of this contract, the successful Offeror or Subcontractor(s) may be put in the position of performing engineering technician and trade support services on space flight hardware, items, and other critical systems designed or built in whole or in part by the Contractor. (For purposes of this clause the term "Contractor" includes any division, separate company, or subsidiary that is wholly-owned by the parent corporation, and includes any of the prime Contractor's teammates and or Subcontractor(s).) The existence of these conflicting roles might bias the contractor's judgment.

(c) Within two working days of receiving any work request that causes such a conflict to arise, the Contractor shall notify the Contracting Officer and provide a report detailing the following:

(1) Nature of the Conflict
(2) Plan for avoiding, neutralizing, or mitigating the conflict
(3) The benefits and risks associated with acceptance of the plan

(d) The Contracting Officer shall review the report and determine which of the following is in the best interests of the Government and shall so advise the Contractor:

(1) The Contractor shall perform consistent with the request for work
(2) The Contractor shall not perform the work
(3) The work will be removed from the contract
(4) The work may be performed by the Government from another source not possessing the conflict of interest
(5) The Contractor may identify a subcontractor who can provide the services and all deliverables shall be delivered directly to the Contracting Officer's Technical Representative and the Contracting Officer. This subcontract will not obviate the contractor's responsibility for acceptable technical performance under the Contract.

(e) Any limitations on future contracting resulting from the Contractor's or its Subcontractor's in preparation of specifications/statements of work or access to proprietary, business confidential, or financial data of another company are identified in Clause H.2 "Limitation of Future Contracting"

(f) The terms of this clause and application of this FAR Subpart to the contract are not subject to negotiation.

(g) The contractor shall include this clause in all subcontract(s)

(End of Clause)

H.4 1852.216-80 TASK ORDERING PROCEDURE (OCT 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:

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

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

(g) 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 __5__ calendar days after receipt of the Contracting Officer's request, the Contractor shall submit a task plan conforming to the request.

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

(1) Date of the order.

(2) Contract number and order number.

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

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

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

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

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

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

(e) The Contractor shall provide acknowledgment of receipt to the Contracting Officer within __3__ 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.

(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.5 SUPPLEMENTAL TASK ORDERING PROCEDURES

(a) This clause supplements the Task Ordering Procedure defined in clause H.4, Task Ordering Procedure.

(b) Work to be performed under this portion of the requirement will be within the parameters of the PWS, paragraph 3.0, and more clearly defined in the Task Orders (TOs) approved by the Contracting Officer and the Contracting Officer's Technical Representative. Additional work will be approved and issued at the IDIQ Task Order WBS elements Level 2 or lower. An overview and flowchart of this process is provided in Attachment J-4, IDIQ Task Order Flow Process.

(c) When the Government issues a Task Order Request (TOR) in accordance with paragraph (b) of Clause H.5, the Contractor shall prepare as part of the Task Order Plan (TOP), the Contractor's estimate of the labor categories, labor hours, other direct costs, and indirect cost required to perform the Task Order requirements. In preparing the estimate, it is mutually agreed and understood that the Contractor or its Subcontractor(s) shall use the labor categories and the lower of the Contractor's/Subcontractor's average actual rates or the Not-to-Exceed (NTE) rates set forth in Attachment J-6, Schedule of Fully Burdened Labor Rates, for each labor category. It is further agreed and understood that the maximum available award fee, equating to a percentage, set forth in Attachment J-6, shall be used by the Contractor to calculate the maximum potential award fee dollars for each Task Order.

(d) The TOR will specify a period of performance not to exceed the ultimate contract period of performance (end of Option Year 4). The TOP shall include estimated cost and maximum potential award fee by each evaluation period within the specified task period of performance. Upon exercise of the contract option periods, the TOs with estimates for the exercised option period shall automatically renew.

(e) Each TO will include the period covered, estimated cost, and maximum potential award fee. At the end of each award fee evaluation period, the current evaluation period values (estimated cost and maximum potential award fee) of all TOs that were active during that evaluation period will be summed and the resulting total value summation will be used as the maximum potential award fee values for that evaluation period. A reconciling unilateral modification to the contract will be issued at that time revising Clause B.2, to reflect the summation of the current total task order values. At the discretion of the Contracting Officer (CO), these reconciling unilateral modifications to reflect the current total TO value summation may be issued at other times as necessary.

(f) A summation of the issued task orders is provided in Attachment J-7, Task Orders by Reference, which will also be revised unilaterally on a periodic basis.

(g) The assigned CO and Contracting Officer's Technical Representative (COTR) will review and approve each TO and any revision thereto. The Government will provide a list of any other personnel to be included in the routing of TOs for review and concurrence. The Government retains the right to disapprove any Task Order Plans (TOPs) at the sole discretion of the Government.

(h) The Contractor shall not begin work until the approved TO is received; however, in extreme emergency situations, the Contractor may be authorized by the CO to begin work immediately. The Contractor shall process the applicable TO within 5 calendar days of being notified of an emergency, and shall not incur costs exceeding $5,000 during the 5 day period, unless an advance waiver is granted by the Contracting Officer. The Government and Contractor shall finalize the TO within 10 calendar days.

(i) Approval of TOs does not relieve the Contractor of its obligation under the "Limitation of Funds" clause of the contract.

(End of Clause)

H.6 TASK ORDER COST INCREASE NOTIFICATION REQUIREMENTS

(a) The requirements of this clause are in conjunction with the Limitation of Cost clause or the Limitation of Funds clause of this contract.

(b) The Contractor shall notify the Contracting Officer in writing when the Contractor has reason to believe that the total cost for performance of any individual task order, exclusive of any fee, will be either greater or substantially less than the total estimated cost stated in the task order. Notification shall not be delayed pending preparation of a proposal.

(c) 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 clause)

H.7 1852.223-70 SAFETY AND HEALTH (APR 2002)

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

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

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

(d) The Contractor shall immediately notify and promptly report to the Contracting Officer or a designee any accident, incident, or exposure resulting in fatality, lost-time occupational injury, occupational disease, contamination of property beyond any stated acceptable limits set forth in the contract Schedule; or property loss of $25,000 or more, or Close Call (a situation or occurrence with no injury, no damage or only minor damage (less than $1,000) but possesses the potential to cause any type mishap, or any injury, damage, or negative mission impact) that may be of immediate interest to NASA, arising out of work performed under this contract. The Contractor is not required to include in any report an expression of opinion as to the fault or negligence of any employee. In addition, service contractors (excluding construction contracts) shall provide quarterly reports specifying lost-time case rate, number of lost-time injuries, exposure, and accident/incident dollar losses as specified in the contract Schedule.

(e) The Contractor shall investigate all work-related incidents, accidents, and Close Calls, to the extent necessary to determine their causes and furnish the Contracting Officer a report, in such form as the Contracting Officer may require, of the investigative findings and proposed or completed corrective actions.

(f) (1) The Contracting Officer may notify the Contractor in writing of any noncompliance with this clause and specify corrective actions to be taken. When the Contracting Officer becomes aware of noncompliance that may pose a serious or imminent danger to safety and health of the public, astronauts and pilots, the NASA workforce (including contractor employees working on NASA contracts), or high value mission critical equipment or property, the Contracting Officer shall notify the Contractor orally, with written confirmation. The Contractor shall promptly take and report any necessary corrective action.

(2) If the Contractor fails or refuses to institute prompt corrective action in accordance with subparagraph (f)(1) of this clause, the Contracting Officer may invoke the stop-work order clause in this contract or any other remedy available to the Government in the event of such failure or refusal.

(g) The Contractor (or subcontractor or supplier) shall insert the substance of this clause, including this paragraph (g) and any applicable Schedule provisions and clauses, with appropriate changes of designations of the parties, in all solicitations and subcontracts of every tier, when one or more of the following conditions exist:

(1) The work will be conducted completely or partly on premises owned or controlled by the Government.

(2) The work includes construction, alteration, or repair of facilities in excess of the simplified acquisition threshold.

(3) The work, regardless of place of performance, involves hazards that could endanger the public, astronauts and pilots, the NASA workforce (including Contractor employees working on NASA contracts), or high value equipment or property, and the hazards are not

adequately addressed by Occupational Safety and Health Administration (OSHA) or Department of Transportation (DOT) regulations (if applicable).

(4) When the Contractor (or subcontractor or supplier) determines that the assessed risk and consequences of a failure to properly manage and control the hazard(s) warrants use of the clause.

(h) The Contractor (or subcontractor or supplier) may exclude the provisions of paragraph (g) from its solicitation(s) and subcontract(s) of every tier when it determines that the clause is not necessary because the application of the OSHA and DOT (if applicable) regulations constitute adequate safety and occupational health protection. When a determination is made to exclude the provisions of paragraph (g) from a solicitation and subcontract, the Contractor must notify and provide the basis for the determination to the Contracting Officer. In subcontracts of every tier above the micro-purchase threshold for which paragraph (g) does not apply, the Contractor (or subcontractor or supplier) shall insert the substance of paragraphs (a), (b), (c), and (f) of this clause).

(i) Authorized Government representatives of the Contracting Officer shall have access to and the right to examine the sites or areas where work under this contract is being performed in order to determine the adequacy of the Contractor's safety and occupational health measures under this clause.

(j) The contractor shall continually update the safety and health plan when necessary. In particular**,** the Contractor shall furnish a list of all hazardous operations to be performed, and a list of other major or key operations required or planned in the performance of the contract, even though not deemed hazardous by the Contractor. NASA and the Contractor shall jointly decide which operations are to be considered hazardous, with NASA as the final authority. Before hazardous operations commence, the Contractor shall submit for NASA concurrence –

(1) Written hazardous operating procedures for all hazardous operations; and/or

(2) Qualification standards for personnel involved in hazardous operations.

(End of Clause)

H.8 1852.223-75 MAJOR BREACH OF SAFETY OR SECURITY (FEB 2002)

(a) Safety is the freedom from those conditions that can cause death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment. Safety is essential to NASA and is a material part of this contract. NASA’s safety priority is to protect: (1) the public; (2) astronauts and pilots; (3) the NASA workforce (including contractor employees working on NASA contracts); and (4) high-value equipment and property. A major breach of safety may constitute a breach of contract that entitles the Government to exercise any of its rights and remedies applicable to material parts of this contract, including termination for default. A major breach of safety must be related directly to the work on the contract. A major breach of safety is an act or omission of the Contractor that consists of an accident, incident, or exposure resulting in a fatality or mission failure; or in damage to equipment or property equal to or greater than $1 million; or in any "willful" or "repeat" violation cited by the Occupational Safety and Health Administration (OSHA) or by a state agency operating under an OSHA approved plan.

(b) Security is the condition of safeguarding against espionage, sabotage, crime (including computer crime), or attack. A major breach of security may constitute a breach of contract that entitles the Government to exercise any of its rights and remedies applicable to material parts of

this contract, including termination for default. A major breach of security may occur on or off Government installations, but must be related directly to the work on the contract. A major breach of security is an act or omission by the Contractor that results in compromise of classified information, illegal technology transfer, workplace violence resulting in criminal conviction, sabotage, compromise or denial of information technology services, equipment or property damage from vandalism greater than $250,000, or theft greater than $250,000.

(c) In the event of a major breach of safety or security, the Contractor shall report the breach to the Contracting Officer. If directed by the Contracting Officer, the Contractor shall conduct its own investigation and report the results to the Government. The Contractor shall cooperate with the Government investigation, if conducted.

(End of Clause)

H.9 1852.225-70 EXPORT LICENSES (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 MSFC, 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.10 1852.235-71 KEY PERSONNEL AND FACILITIES (MAR 1989)

(a) The personnel and/or facilities listed below (or specified in the contract Schedule) are considered essential to the work being performed under this contract. Before removing, replacing, or diverting any of the listed or specified personnel or facilities, the Contractor shall (1) notify the Contracting Officer reasonably in advance and (2) submit justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on this contract.

(b) The Contractor shall make no diversion without the Contracting Officer's written consent; provided that the Contracting Officer may ratify in writing the proposed change, and that ratification shall constitute the Contracting Officer's consent required by this clause.

(c) The list of personnel and/or facilities (shown below or as specified in the contract Schedule) may, with the consent of the contracting parties, be amended from time to time during the course of the contract to add or delete personnel and/or facilities.

(b)(4)

(End of Clause)

H.11 1852.242-72 OBSERVANCE OF LEGAL HOLIDAYS (AUG 1992) -- ALTERNATE II (OCT 2000)

(a) The on-site Government personnel observe the following holidays:

New Year's Day
Labor Day
Martin Luther King, Jr.'s Birthday
Columbus Day
President's Day
Veterans Day
Memorial Day
Thanksgiving Day
Independence Day
Christmas Day

Any other day designated by Federal statute, Executive order, or the President's proclamation.

(b) When any holiday falls on a Saturday, the preceding Friday is observed. When any holiday falls on a Sunday, the following Monday is observed. Observance of such days by Government personnel shall not by itself be cause for an additional period of performance or entitlement of compensation except as set forth within the contract.

(e) When the NASA installation grants administrative leave to its Government employees (e.g., as a result of inclement weather, potentially hazardous conditions, or other special circumstances), Contractor personnel working on-site should also be dismissed. However, the contractor shall provide sufficient on-site personnel to perform round-the-clock requirements of critical work already in process, unless otherwise instructed by the Contracting Officer or authorized representative.

(f) Whenever administrative leave is granted to Contractor personnel pursuant to paragraph (e) of this clause, it shall be without loss to the Contractor. The cost of salaries and wages to the Contractor for the period of any such excused absence shall be a reimbursable item of cost under this contract for employees in accordance with the Contractor's established accounting policy.

(End of clause)

H.12 MSFC 52.223-90 ASBESTOS MATERIAL (JUN 2002)

During performance of this contract, Contractor personnel performing work in MSFC buildings may come in contact with materials containing asbestos. MSFC Buildings 4200, 4201, 4202, 4612, 4619, 4620, 4623, 4663 and 4666 are of special concern since they are known to contain a sprayed on fire insulation on or above the ceiling, usually located on the metal or concrete structure of the buildings. These buildings and all other MSFC buildings may contain asbestos in floor tile, pipe and lagging insulation, exterior siding, roofing felt, and many other building materials. Prior to disturbing suspected asbestos material in any manner, the Contractor shall notify MSFC's Occupational Medicine and Environmental Health Services, for guidance.

Contractor shall be responsible for ensuring that all Contractor personnel working onsite are made aware of and comply with this clause.

(End of Clause)

H.13 MSFC 52.223-91 HAZARDOUS MATERIAL REPORTING (AUG 2005)

(a) If during the performance of this contract, the Contractor transports or accepts delivery of any hazardous materials (hazardous as defined under the latest version of Federal Standard No. 313, including revisions adopted during the term of the contract) on-site to the Marshall Space Flight Center, the hazardous material shall be processed through MSFC Central Receiving to be bar-coded for inventory. Chemical containers shall be managed in accordance with the provisions of MWI 8550.5, "Hazardous Material Management." The Contractor shall be responsible for ensuring that all Contractor/subcontractor personnel are made aware of and comply with this clause.

(b) Nothing contained in this clause shall relieve the Contractor from complying with applicable Federal, State, and local laws, codes, ordinances, and regulations (including the obtaining of licenses and permits) in connection with hazardous material; or with other clauses regarding hazardous materials which may be contained in the order.

(End of Clause)

H.14 SECURITY/BADGING REQUIREMENTS FOR FOREIGN NATIONAL VISITORS AND EMPLOYEES OF FOREIGN CONTRACTORS

(a) An employee of a domestic Marshall Space Flight Center (MSFC) contractor or its subcontractor who is not a U.S. citizen (foreign national) may not be admitted to the MSFC site for purposes of performing work without special arrangements. In addition, all employees or representatives of a foreign MSFC contractor/subcontractor may not be admitted to the MSFC site without special arrangements. For employees as described above, advance notice must be given to the MSFC Protective Services Office at least 2 months prior to the scheduled need for access to the site so that instructions on obtaining access may be provided.

(b) All visit/badge requests for persons described in paragraph (a) above must be entered in the NASA Foreign National Management System (NFNMS) for acceptance, review, concurrence and approval purposes. When an authorized company official requests a MSFC badge for site access, he/she is certifying that steps have been taken to ensure that its contractor or subcontractor employees, visitors, or representatives will not be given access to export-controlled or classified information for which they are not authorized. The authorized company officials shall serve as the contractor's representative(s) in certifying that all visit/badge request forms are processed in accordance with MSFC security and export control procedures. No foreign national, representative, or resident alien contractor/subcontractor employee shall be granted access into MSFC until a completed request has been approved and processed through the NFNMS. Unescorted access will not be granted unless the MSFC Protective Services Office has completed a favorable National Agency Check (NAC).

(c) The contractor agrees that it will not employ for the performance of work onsite at the MSFC any individuals who are not legally authorized to work in the United States. If the MSFC Industrial Security Specialist or the contracting officer has reason to believe that any employee of the contractor may not be legally authorized to work in the United States and/or on the contract, the contractor may be required to furnish copies of Form I-9 (Employment Eligibility Verification), U.S.

Department of Labor Application for Alien Employment Certification, and any other type of employment authorization document.

(d) The contractor agrees to provide the information requested by the MSFC Protective Services Office in order to comply with NASA policy directives and guidelines related to foreign visits to NASA facilities so that (1) the visitor/employee/ representative may be allowed access to MSFC or other NASA Centers for performance of this contract, (2) required investigations can be conducted, and (3) required annual or revalidation reports can be submitted to NASA Headquarters. All requested information must be submitted in a timely manner in accordance with instructions provided by MSFC or any other Center to be visited

(End of Clause)

H.15 MSFC 52.223-92 ENVIRONMENTAL – GENERAL CLAUSE (DEC 2006)

NASA/Marshall has developed and maintains an Environmental Management System, in accordance with Executive Order 13148, to support and implement its environmental policy of:

"Enabling Marshall's mission through environmental compliance and stewardship and by providing a safe and healthful workplace." (MPD 8500.1, "MSFC Environmental Policy").

Contractors performing on-site shall comply with all applicable Environmental polices and procedures including, but not limited to, MPD 8500.1 and MPR 8500.1, "MSFC Environmental Management Program." MSFC contractors requiring on-site activities that could potentially impact the environment shall be responsible for following all established NASA/Marshall environmental procedures. These procedures and other applicable policies and procedures are available by contacting the NASA/Marshall Environmental Engineering & Occupational Health Office. Failure to comply with environmental policies and procedures, may result in damage to the environment, and could potentially result in regulatory penalties against NASA and/or the Contractor, and Contractor loss of access to NASA/Marshall facilities.

(End of Clause)

H.16 SAFETY PERFORMANCE EVALUATION

1. Contractor Responsibility. The Contractor is responsible for maintaining an effective safety program during the course of the contract with a goal to achieve a world-class program within the term of the contract. The Contractor will ensure that the requirements of the MSFC approved Contractor's Safety and Health Plan and applicable Data Requirement Documents (DRD 1102SA-001, 1102SA-003 provided in Attachment J-2, Data Procurement Document) are met. Contractor safety performance evaluation will be based on the MSFC safety program elements. The Contractor shall conduct a quarterly self-evaluation based on these criteria. The CO/COTR, in coordination with the MSFC Safety Office, will validate the Contractor's self-evaluation. Every quarter, the agreed score will be used to assess performance appropriately - positive or negative. For the purpose of assessing the quarterly score, the Contractor and the CO/COTR, in coordination with the MSFC Safety Office, will reach a mutually agreeable determination based on the metrics reflected in the attachment. In cases where the Contractor and CO/COTR cannot reach agreement, the MSFC Ombudsman will hear arguments from both sides and make a final decision. This process shall not preclude the Contracting Officer from taking immediate action for any serious, willful, blatant, or continued violations of MSFC safety policy or procedures.

2. Evaluation Criteria. Contractor self-evaluation and Government validation will be based on the applicable elements and sub-elements of the MSFC safety program shown below. Specific criteria are shown on Attachment J-11 entitled "Safety and Health Management Implementation Guide and Assessment Matrix." Deviations from the matrix criteria may be made, for cause, and must be approved by the COTR, CO and Government Safety Representative. It should be noted that Element 1 has a management and an employee component. These are simply averaged to obtain the score for Element 1. The result should be carried to the second decimal point.

Management Commitment and Employee Involvement (ELEMENT 1)	**Hazard Prevention and Control (ELEMENT 3)**
Documented Safety Policy and Goals	Hazard Identification Process
Safety Committees	Facility and Equipment Maintenance
Safety Meetings	Emergency Program and Drills
Subcontractor Safety	Emergency Medical Care Program
Resources	Personal Protective Equipment
Access to Professional Safety Staff	Health Program
Accountability (Disciplinary Program)	
Annual Evaluation	

System and Worksite Hazard Analysis (ELEMENT 2)	**Safety and Health Training (ELEMENT 4)**
Complete and Update Baseline Surveys	Employee
Performance Analysis of New Work	Supervisor
Job Hazard Analysis/Process Review	Manager
Self-Inspection	
Employee Hazard Reporting	
Mishap/Close Call Investigation	
Injury/Illness Rates	

3. Performance Recognition. Contractor performance will be recognized as follows:

- **Level I** – Annual rating score of ≥ 36 based on the average of the quarterly assessment scores, and a Lost-Time Case (LTC) Rate.
  ≤ 50% of the LTC for the applicable Standard Industrial Classification (SIC) rate.

  Formal award with public recognition

  Appropriate past performance referral provided.

Exception: *Contractors with less than 100 employees located onsite MSFC*. To be rated in Level I, the Contractor shall have no lost time injuries during the past year.

- **Level II** – Annual rating score of ≥ 28 based on the average quarterly assessment score, and a Lost-Time Case (LTC) Rate < the applicable Standard Industrial Classification (SIC) rate and the scores remain the same, or reflect improved performance, from the previous period. If scores reflect a decrease in performance, no letter of

  Formal Letter of Commendation

  Will impact contract evaluation and past performance referrals.

commendation will be issued.

Exception: *Contractors with less than 100 employees located onsite MSFC*. To be rated in Level II, the Contractor shall have no more than one lost time injury during the past year.

• **Level III** – Quarterly rating score of ≤ 16 or a Lost-Time Case (LTC) Rate ≥ than the Standard Industrial Classification (SIC) rate.	*Formal letter expressing concern*. *Corrective Action Plan Requested. Data Placed in Past Performance Database.* **Failure to improve could result in contract options not being exercised.**

Exception: Contractors with less than 100 employees located onsite MSFC*. A Level III rating will be given to a contractor having greater than two lost time injuries during the past year.*

• If contractor's Safety Performance evaluation does not fall within the above categories.	*No recognition.*

NOTE: The most current Department of Labor SIC rate, effective at the beginning of the annual evaluation period, will be utilized for LTC Rate evaluation. Lost Time Cases shall be recorded in accordance with NASA requirements specified in MWI 8621.1, "Close Call and Mishap Reporting and Investigation Program." Final decisions on any disputed lost time injury determinations will be handled by established Government regulatory procedures.

4. Contractor Accountability for Mishaps. The Contractor shall not be held accountable for injuries to their personnel or damage to the property they control that is caused by individuals or situations clearly outside the control of their contract.

5. Evaluation Process. The evaluation process will be based on the major elements and their sub-elements cited in Paragraph 2. The evaluation process will include these steps:

- Contractor to conduct quarterly self-assessment and assign numerical score to each element.
- Contractor self-assessments will address compliance with their approved Safety and Health Plan.
- Contractor to have self-assessment validated by CO/ COTR and S&MA Directorate.
- On an annual basis, the Contracting Officer will apply contract incentives/recognition or consequences based on the average quarterly scores. The Contracting Officer will make a determination on a quarterly basis for items requested in paragraph 6 that are not reported. (Also, see paragraph 7 below.)

The evaluation process will use the Safety and Health Management Implementation Guide and Assessment Matrix at Attachment J-11.

6. Safety Metric Reporting. The Contractor shall utilize MSFC Form 4371 to submit, on a monthly basis, information on all personnel and property mishaps that meet the criteria of a NASA Recordable Mishap (NPG 8621.1). Close calls and minor cases, including first aid and non-injury cases, shall be reported when there is a potential lessons learned or when action needs to be taken to prevent more serious damage, loss, or

personal injury, (including communication of the incident to promote employee awareness). The report shall also include total hours worked and the number of safety inspections and safety meetings conducted during the month.

The Contractor shall also utilize NASA Form 1627 to include details of any mishap, results of the investigation, and the corrective action plan.

7. Failure to Report. If the Contractor fails to report the items in paragraph 6 above in accordance with this contract, an amount of $1,000 will be deducted for each occurrence of failure to report the required data.

(End of Clause)

H.17 ASSOCIATE CONTRACTOR AGREEMENTS

(a) In order to achieve the requirements of this contract, the Contractor shall establish, in conjunction with the Contracting Officer (CO) and Contracting Officer's Technical Representative (COTR), the means for coordination and exchange of information with multiple onsite MSFC contractors. The purpose of this clause is to facilitate cooperation among MSFC professional services contractors in providing support for accomplishing MSFC's mission. The Contractor Agreements contemplated by this clause, established within 180 days after contract award, will be added by contract modification to this paragraph as required.

(b) MSFC requires Associate Contractor Agreements (prime, teammates, and subcontractors), including, but not limited to, the following:

Systems Development
And Operations Support (SDOS)

Pressurents, Propellants and Calibration
(PP&C)

Engineering, Science & Techncial
Services (ESTS)

(b)(4)

(c) The Contractor shall document agreements with other Associate Contractors described in (a) above via Associate Contractor agreements. The Government will not be a party in such Associate Contractor agreements. A copy of each such agreement shall be provided to the CO. All costs associated with such agreements are included in the negotiated cost of this contract.

(d) The Contractor is not relieved of any contract requirements or entitled to any adjustments to the contract terms because of the failure to resolve a disagreement with an Associate Contractor. Liability for the improper disclosure of any proprietary data contained in or referenced by any agreement shall rest with the parties to the agreement, and not the Government.

(End of Clause)

H.18 ADVANCED AGREEMENTS

(b)(4)

(b)(4)

(End of Clause)

[END OF SECTION]

PART II - CONTRACT CLAUSES

SECTION I - CONTRACT CLAUSES

I.1 LISTING OF CLAUSES INCORPORATED BY REFERENCE

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 addresses:

FAR Clauses: *http://www.arnet.gov/far/*
NASA FAR Supplement clauses: *http://www.hq.nasa.gov/office/procurement/regs/nfstoc.htm*
MSFC Clauses: *http://ec.msfc.nasa.gov/msfc/msfc_uni.html*

PART A: FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)

Clause Number	Title	Date
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	SEP 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	SEP 2007
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 Registration	JUL 2006
52.204-9	Personal Identity Verification of Contractor's Personnel *(See Attachment J-18 for details)*	SEP 2007
52.209-6	Protecting the Government's Interest When Subcontracting with Contractors Debarred, Suspended, or Proposed for Debarment	SEP 2006
52.211-15	Defense Priority and Allocation Requirements	SEP 1990
52.215-2	Audit and Records-Negotiation	JUN 1999
52.215-8	Order of Precedence-Uniform Contract Format	OCT 1997
52.215-10	Price Reduction for Defective Cost or Pricing Data	OCT 1997
52.215-11	Price Reduction for Defective Cost or Pricing Data-Modifications	OCT 1997
52.215-12	Subcontractor Cost or Pricing Data	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
52.215-17	Waiver of Facilities Capital Cost of Money	OCT 1997
52.215-18	Reversion or Adjustment of Plans for Postretirement Benefits (PRB) Other Than Pensions	JUL 2005

Clause Number	Title	Date
52.215-21	Requirements for Cost or Pricing Data or Information Other Than Cost or Pricing Data-Modifications Alternate I – **Microsoft Excel (PC Compatible)** Alternate II – **Send Copies to ACO & DCAA** Alternate III – **TBD by CO at time of submission**	OCT 1997
52.216-7	Allowable Cost and Payment	DEC 2002
52.217-8	Option to Extend Services – **30 days**	NOV 1999
52.219-8	Utilization of Small Business Concerns	MAY 2004
52.219-14	Limitations on Subcontracting	DEC 1996
52.222-1	Notice to the Government of Labor Disputes	FEB 1997
52.222-2	Payment for Overtime Premiums **"Insert in Section B"**	JUL 1990
52.222-3	Convict Labor	JUN 2003
52.222-4	Contract Work Hours and Safety Standards Act-Overtime Compensation	JUL 2005
52.222-21	Prohibition of Segregated Facilities	FEB 1999
52.222-26	Equal Opportunity	MAY 2007
52.222-35	Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans	SEP 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	SEP 2006
52.222-41	Service Contract Act of 1965, As Amended	NOV 2007
52.223-3	Hazardous Material Identification and Material Safety Data (Alternate I)	JUL 1995
52.223-5	Pollution Prevention and Right-to-Know Information Alternate I and Alternate II	AUG 2003
52.223-6	Drug-Free Workplace	MAY 2001
52.223-10	Waste Reduction Program	AUG 2000
52.223-14	Toxic Chemical Release Reporting	AUG 2003
52.225-13	Restrictions on Certain Foreign Purchases	FEB 2006
52.227-1	Authorization and Consent	JUL 1995
52.227-2	Notice and Assistance Regarding Patent and Copyright Infringement	AUG 1996
52.227-10	Filing of Patent Applications - Classified Subject Matter	APR 1984
52.227-14	Rights In Data-General	JUN 1987
52.227-16	Additional Data Requirements	JUN 1987
52.228-7	Insurance-Liability to Third Persons	MAR 1996
52.230-2	Cost Accounting Standards	APR 1998
52.230-3	Disclosure and Consistency of Cost Accounting	APR 1998
52.230-6	Administration of Cost Accounting Standards	APR 2005
52.232-9	Limitation on Withholding of Payments	APR 1984
52.232-17	Interest	JUN 1996
52.232-19	Availability of Funds for the Next Fiscal Year *Insert*: February 28, 2007	APR 1984
52.232-22	Limitation of Funds	APR 1984

Clause Number	Title	Date
52.232-23	Assignment of Claims	JAN 1986
52.232-25	Prompt Payment (Alternate I)	FEB 2002
52.232-33	Payment By Electronic Funds Transfer- Central Contractor Registration	OCT 2003
52.233-1	Disputes (Alternate I)	DEC 1991
52.233-3	Protest after Award (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
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 (Alternate II)	APR 1984
52.244-5	Competition in Subcontracting	DEC 1996
52.245-1	Government Property	JUN 2007
52.246-25	Limitation on Liability – Services	FEB 1997
52.247-1	Commercial Bill of Lading Notice	FEB 2006
52.248-1	Value Engineering	FEB 2000
52.249-6	Termination (Cost-Reimbursement)	MAY 2004
52.249-14	Excusable Delays	APR 1984
52.251-1	Government Supply Sources Interagency	APR 1984
52.251-2	Fleet Management System Vehicles and Related Services	JAN 1991
52.253-1	Computer Generated Forms	JAN 1991

(End of Clause)

PART B: NASA FAR SUPPLEMENT (48 CFR CHAPTER 18) CLAUSES

Clause Number	Title	Date
1852.216-89	Assignment and Release Forms	JUL 1997
1852.219-74	Use of Rural Area Small Businesses	SEP 1990
1852.223-74	Drug and Alcohol-Free Workforce	MAR 1996
1852.227-14	Rights in Data--General **Modifies FAR Clause**	
1852.237-70	Emergency Evacuation Procedures	DEC 1988
1852.242-78	Emergency Medical Services and Evacuation	APR 2001
1852.243-71	Shared Shavings	MAR 1997

(End of Clause)

I.2 REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFEROR

The completed provision 52.204-8, Annual Representations and Certifications, including any amended representation(s) made at paragraph (b) of the provision; and other representations, certifications and other statements contained in Section K completed and submitted as part of the offer dated 9 January 2008 are hereby incorporated by reference in this resulting contract.

(End of Clause)

I.3 1852.204-75 SECURITY CLASSIFICATION REQUIREMENTS (SEP 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 Clearance. See Federal Acquisition Regulation clause 52.204-2 in this contract and DD Form 254, Contract Security Classification Specification, Attachment J-19.

(End of Clause)

I.4 1852.204-76 SECURITY REQUIREMENTS FOR UNCLASSIFIED INFORMATION TECHNOLOGY RESOURCES (MAY 2007)

(a) The Contractor shall be responsible for information and information technology (IT) security when--

(1) The Contractor or its subcontractors must obtain physical or electronic (i.e., authentication level 2 and above as defined in National Institute of Standards and Technology (NIST) Special Publication (SP) 800-63, Electronic Authentication Guideline) access to NASA's computer systems, networks, or IT infrastructure; or

(2) Information categorized as low, moderate, or high by the Federal Information Processing Standards (FIPS) 199, Standards for Security Categorization of Federal Information and Information Systems is stored, generated, processed, or exchanged by NASA or on behalf of NASA by a contractor or subcontractor, regardless of whether the information resides on a NASA or a contractor/subcontractor's information system.

(b) IT Security Requirements.

(1) Within 30 days after contract award, a Contractor shall submit to the Contracting Officer for NASA approval an IT Security Plan, Risk Assessment, and FIPS 199, Standards for Security Categorization of Federal Information and Information Systems, Assessment. These plans and assessments, including annual updates shall be incorporated into the contract as compliance documents.

(i) The IT system security plan shall be prepared consistent, in form and content, with NIST SP 800-18, Guide for Developing Security Plans for Federal Information Systems, and any additions/augmentations described in NASA Procedural Requirements (NPR) 2810, Security of Information Technology. The security plan shall identify and document appropriate IT security controls consistent with the sensitivity of the information and the requirements of Federal Information Processing Standards (FIPS) 200, Recommended Security Controls for Federal Information Systems. The plan shall be reviewed and updated in accordance with NIST SP 800-26, Security Self-Assessment Guide for Information Technology Systems, and FIPS 200, on a yearly basis.

(ii) The risk assessment shall be prepared consistent, in form and content, with NIST SP 800-30, Risk Management Guide for Information Technology Systems, and any

additions/augmentations described in NPR 2810. The risk assessment shall be updated on a yearly basis.

(iii) The FIPS 199 assessment shall identify all information types as well as the ``high water mark,'' as defined in FIPS 199, of the processed, stored, or transmitted information necessary to fulfill the contractual requirements.

(2) The Contractor shall produce contingency plans consistent, in form and content, with NIST SP 800-34, Contingency Planning Guide for Information Technology Systems, and any additions/augmentations described in NPR 2810. The Contractor shall perform yearly ``Classroom Exercises.'' ``Functional Exercises,'' shall be coordinated with the Center CIOs and be conducted once every three years, with the first conducted within the first two years of contract award. These exercises are defined and described in NIST SP 800-34.

(3) The Contractor shall ensure coordination of its incident response team with the NASA Incident Response Center (NASIRC) and the NASA Security Operations Center, ensuring that incidents are reported consistent with NIST SP 800-61, Computer Security Incident Reporting Guide, and the United States Computer Emergency Readiness Team's (US-CERT) Concept of Operations for reporting security incidents. Specifically, any confirmed incident of a system containing NASA data or controlling NASA assets shall be reported to NASIRC within one hour that results in unauthorized access, loss or modification of NASA data, or denial of service affecting the availability of NASA data.

(4) The Contractor shall ensure that its employees, in performance of the contract, receive annual IT security training in NASA IT Security policies, procedures, computer ethics, and best practices in accordance with NPR 2810 requirements. The Contractor may use Web-based training available from NASA to meet this requirement.

(5) The Contractor shall provide NASA, including the NASA Office of Inspector General, access to the Contractor's and subcontractors' facilities, installations, operations, documentation, databases, and personnel used in performance of the contract. Access shall be provided to the extent required to carry out IT security inspection, investigation, and/or audits to safeguard against threats and hazards to the integrity, availability, and confidentiality of NASA information or to the function of computer systems operated on behalf of NASA, and to preserve evidence of computer crime. To facilitate mandatory reviews, the Contractor shall ensure appropriate compartmentalization of NASA information, stored and/or processed, either by information systems in direct support of the contract or that are incidental to the contract.

(6) The Contractor shall ensure that system administrators who perform tasks that have a material impact on IT security and operations demonstrate knowledge appropriate to those tasks. Knowledge is demonstrated through the NASA System Administrator Security Certification Program. A system administrator is one who provides IT services (including network services, file storage, and/or web services) to someone other than themselves and takes or assumes the responsibility for the security and administrative controls of that service. Within 30 days after contract award, the Contractor shall provide to the Contracting Officer a list of all system administrator positions and personnel filling those positions, along with a schedule that ensures certification of all personnel within 90 days after contract award. Additionally, the Contractor should report all personnel changes which impact system administrator positions within 5 days of the personnel change and ensure these individuals obtain System Administrator certification within 90 days after the change.

(7) The Contractor shall ensure that NASA's Sensitive But Unclassified (SBU) information as defined in NPR 1600.1, NASA Security Program Procedural Requirements, which includes privacy information, is encrypted in storage and transmission.

(8) When the Contractor is located at a NASA Center or installation or is using NASA IP address space, the Contractor shall--

(i) Submit requests for non-NASA provided external Internet connections to the Contracting Officer for approval by the Network Security Configuration Control Board (NSCCB);

(ii) Comply with the NASA CIO metrics including patch management, operating systems and application configuration guidelines, vulnerability scanning, incident reporting, system administrator certification, and security training; and

(iii) Utilize the NASA Public Key Infrastructure (PKI) for all encrypted communication or non-repudiation requirements within NASA when secure email capability is required.

(c) Physical and Logical Access Requirements.

(1) Contractor personnel requiring access to IT systems operated by the Contractor for NASA or interconnected to a NASA network shall be screened at an appropriate level in accordance with NPR 2810 and Chapter 4, NPR 1600.1, NASA Security Program Procedural Requirements. NASA shall provide screening, appropriate to the highest risk level, of the IT systems and information accessed, using, as a minimum, National Agency Check with Inquiries (NACI). The Contractor shall submit the required forms to the NASA Center Chief of Security (CCS) within fourteen (14) days after contract award or assignment of an individual to a position requiring screening. The forms may be obtained from the CCS. At the option of NASA, interim access may be granted pending completion of the required investigation and final access determination. For Contractors who will reside on a NASA Center or installation, the security screening required for all required access (e.g., installation, facility, IT, information, etc.) is consolidated to ensure only one investigation is conducted based on the highest risk level. Contractors not residing on a NASA installation will be screened based on their IT access risk level determination only. See NPR 1600.1, Chapter 4.

(2) Guidance for selecting the appropriate level of screening is based on the risk of adverse impact to NASA missions. NASA defines three levels of risk for which screening is required (IT-1 has the highest level of risk).

(i) IT-1--Individuals having privileged access or limited privileged access to systems whose misuse can cause very serious adverse impact to NASA missions. These systems include, for example, those that can transmit commands directly modifying the behavior of spacecraft, satellites or aircraft.

(ii) IT-2--Individuals having privileged access or limited privileged access to systems whose misuse can cause serious adverse impact to NASA missions. These systems include, for example, those that can transmit commands directly modifying the behavior of payloads on spacecraft, satellites or aircraft; and those that contain the primary copy of ``level 1'' information whose cost to replace exceeds one million dollars.

(iii) IT-3--Individuals having privileged access or limited privileged access to systems whose misuse can cause significant adverse impact to NASA missions. These systems include, for example, those that interconnect with a NASA network in a way that exceeds access by the general public, such as bypassing firewalls; and systems operated by the Contractor for NASA whose function or information has substantial cost to replace, even if these systems are not interconnected with a NASA network.

(3) Screening for individuals shall employ forms appropriate for the level of risk as established in Chapter 4, NPR 1600.1.

(4) The Contractor may conduct its own screening of individuals requiring privileged access or limited privileged access provided the Contractor can demonstrate to the Contracting Officer that the procedures used by the Contractor are equivalent to NASA's personnel screening procedures for the risk level assigned for the IT position.

(5) Subject to approval of the Contracting Officer, the Contractor may forgo screening of Contractor personnel for those individuals who have proof of a--

(i) Current or recent national security clearances (within last three years);

(ii) Screening conducted by NASA within the last three years that meets or exceeds the screening requirements of the IT position; or

(iii) Screening conducted by the Contractor, within the last three years, that is equivalent to the NASA personnel screening procedures as approved by the Contracting Officer and concurred on by the CCS.

(d) The Contracting Officer may waive the requirements of paragraphs (b) and (c)(1) through c)(3) upon request of the Contractor. The Contractor shall provide all relevant information requested by the Contracting Officer to support the waiver request.

(e) The Contractor shall contact the Contracting Officer for any documents, information, or forms necessary to comply with the requirements of this clause.

(f) At the completion of the contract, the contractor shall return all NASA information and IT resources provided to the contractor during the performance of the contract and certify that all NASA information has been purged from contractor-owned systems used in the performance of the contract.

(g) The Contractor shall insert this clause, including this paragraph (g), in all subcontracts:

(1) Have physical or electronic access to NASA's computer systems, networks, or IT infrastructure; or

(2) Use information systems to generate, store, process, or exchange data with NASA or on behalf of NASA, regardless of whether the data resides on a NASA or a contractor's information system.

(End of clause)

I.5 1852.215-84 OMBUDSMAN (OCT 2003) Alternate I (JUN 2000)

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

(b) If resolution cannot be made by the contracting officer, interested parties may contact the installation ombudsman, DE01/Robin N. Henderson; Address: George C. Marshall Space Flight Center Building 4200, Room 918A Marshall Space Flight Center, Huntsville, AL 35812; Telephone: 256-544-1919, , Fax: 256-544-7920, E-mail: robin.n.henderson@nasa.gov. Concerns, issues, disagreements, and recommendations which cannot be resolved at the installation may be referred to the NASA ombudsman, the Director of the Contract Management Division, at 202-358-0445, facsimile 202-358-3083, e-mail, james.a.balinskas@nasa.gov. Please do not contact the ombudsman to request copies of the solicitation, verify offer due date, or clarify technical requirements. Such inquiries shall be directed to the contracting officer or as specified elsewhere in this document.

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

(End of Clause)

I.6 1852.219-76 NASA 8 PERCENT GOAL (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.

(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.7 1852.228-75 MINIMUM INSURANCE COVERAGE (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."

(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.8 1852.237-72 ACCESS TO SENSITIVE INFORMATION (JUN 2005)

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

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

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

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

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

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

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

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

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

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

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

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

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

(End of Clause)

I.9 1852.237-73 RELEASE OF SENSITIVE INFORMATION (JUN 2005)

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

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

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

Mark the title page with the following legend:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(End of Clause)

I.10 52.203-13 CONTRACTOR CODE OF BUSINESS ETHICS AND CONDUCT (DEC 2007)

(a) Definition. United States, as used in this clause, means the 50 States, the District of Columbia, and outlying areas.

(b) Code of business ethics and conduct.

(1) Within 30 days after contract award, unless the Contracting Officer establishes a longer time period, the Contractor shall--
(i) Have a written code of business ethics and conduct; and
(ii) Provide a copy of the code to each employee engaged in performance of the contract.

(2) The Contractor shall promote compliance with its code of business ethics and conduct.

(c) Awareness program and internal control system for other than small businesses. This paragraph (c) does not apply if the Contractor has represented itself as a small business concern pursuant to the award of this contract. The Contractor shall establish within 90 days after contract award, unless the Contracting Officer establishes a longer time period--

(1) An ongoing business ethics and business conduct awareness program; and

(2) An internal control system.
(i) The Contractor's internal control system shall--
(A) Facilitate timely discovery of improper conduct in connection with Government contracts; and
(B) Ensure corrective measures are promptly instituted and carried out.
(ii) For example, the Contractor's internal control system should provide for--

(A) Periodic reviews of company business practices, procedures, policies, and internal controls for compliance with the Contractor's code of business ethics and conduct and the special requirements of Government contracting;
(B) An internal reporting mechanism, such as a hotline, by which employees may report suspected instances of improper conduct, and instructions that encourage employees to make such reports;
(C) Internal and/or external audits, as appropriate; and
(D) Disciplinary action for improper conduct.

(d) Subcontracts. The Contractor shall include the substance of this clause, including this paragraph (d), in subcontracts that have a value in excess of $5,000,000 and a performance period of more than 120 days, except when the subcontract--

(1) Is for the acquisition of a commercial item; or

(2) Is performed entirely outside the United States.

(End of clause)

I.11 52.203-14 DISPLAY OF HOTLINE POSTER(S) (DEC 2007)

(a) Definition. United States, as used in this clause, means the 50 States, the District of Columbia, and outlying areas.

(b) Display of fraud hotline poster(s). Except as provided in paragraph (c)--
(1) During contract performance in the United States, the Contractor shall prominently display in common work areas within business segments performing work under this contract and at contract work sites—
(i) Any agency fraud hotline poster or Department of Homeland Security (DHS) fraud hotline poster identified in paragraph (b)(3) of this clause; and
(ii) Any DHS fraud hotline poster subsequently identified by the Contracting Officer.

(2) Additionally, if the Contractor maintains a company website as a method of providing information to employees, the Contractor shall display an electronic version of the poster(s) at the website.

(3) Any required posters may be obtained as follows:
Poster(s) Obtain from
---------- ----------
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(Contracting Officer shall insert-- (i) Appropriate agency name(s) and/or title of applicable Department of Homeland Security fraud hotline poster); and
(ii) The website(s) or other contact information for obtaining the poster(s).)

(c) If the Contractor has implemented a business ethics and conduct awareness program, including a reporting mechanism, such as a hotline poster, then the Contractor need not display any agency fraud hotline posters as required in paragraph (b) of this clause, other than any required DHS posters.

(d) Subcontracts. The Contractor shall include the substance of this clause, including this paragraph (d), in all subcontracts that exceed $5,000,000, except when the subcontract--
(1) Is for the acquisition of a commercial item; or

(2) Is performed entirely outside the United States.

(End of clause)

I.12 52.216-18 ORDERING (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 March 1, 2008 through February 28, 2013, if options are exercised.

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

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

(End of Clause)

I.13 52.216-19 ORDERING LIMITATIONS (OCT 1995)

(a) *Minimum order.* When the Government requires supplies or services under PWS paragraph 3.0 of this contract in an amount of less than **$1,000.00**, 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 **$12,000,000**;

(2) Any order for a combination of items in excess of **$41,600,000**; or

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

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

(d) Notwithstanding paragraphs (b) and (c) of this section, the Contractor shall honor any order exceeding the maximum order limitations in paragraph (b), unless that order (or orders) is returned to the ordering office within 10 days after issuance, with written notice stating the Contractor's intent not to ship the item (or items) called for and the reasons. Upon receiving this notice, the Government may acquire the supplies or services from another source.

(End of Clause)

I.14 52.216-22 INDEFINITE QUANTITY (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 February 28, 2013.

(End of Clause)

I.15 52.208-8 REQUIRED SOURCES FOR HELIUM AND HELIUM USAGE DATA (APR 2002)

As prescribed in 8.505, insert the following clause:

(a) *Definitions*.

"**Bureau of Land Management**", as used in this clause, means the Department of the Interior, Bureau of Land Management, Amarillo Field Office, Helium Operations, located at 801 South Fillmore Street, Suite 500, Amarillo, TX 79101-3545.

"**Federal helium supplier**" means a private helium vendor that has an in-kind crude helium sales contract with the Bureau of Land Management (BLM) and that is on the BLM Amarillo Field Office's Authorized List of Federal Helium Suppliers available via the Internet at *http://www.nm.blm.gov/www/amfo/amfo_home.html*.

"**Major helium requirement**" means an estimated refined helium requirement greater than 200,000 standard cubic feet (scf) (measured at 14.7 pounds per square inch absolute pressure and 70 degrees Fahrenheit temperature) of gaseous helium or 7510 liters of liquid helium delivered to a helium use location per year.

(b) *Requirements* –

(1) Contractors must purchase major helium requirements from Federal helium suppliers, to the extent that supplies are available.

(2) The Contractor shall provide to the Contracting Officer the following data within 10 days after the Contractor or subcontractor receives a delivery of helium from a Federal helium supplier-

(i) The name of the supplier;

(ii) The amount of helium purchased;

(iii) The delivery date(s); and

(iv) The location where the helium was used.

(c) *Subcontracts*. The Contractor shall insert this clause, including this paragraph (c), in any subcontract or order that involves a major helium requirement.

(End of Clause)

I.16 52.215-19 NOTIFICATION OF OWNERSHIP CHANGES (OCT 1997)

(a) The Contractor shall make the following notifications in writing:

(1) When the Contractor becomes aware that a change in its ownership has occurred, or is certain to occur, that could result in changes in the valuation of its capitalized assets in the accounting records, the Contractor shall notify the Administrative Contracting Officer (ACO) within 30 days.

(2) The Contractor shall also notify the ACO within 30 days whenever changes to asset valuations or any other cost changes have occurred or are certain to occur as a result of a change in ownership.

(b) The Contractor shall-

(1) Maintain current, accurate, and complete inventory records of assets and their costs;

(2) Provide the ACO or designated representative ready access to the records upon request;

(3) Ensure that all individual and grouped assets, their capitalized values, accumulated depreciation or amortization, and remaining useful lives are identified accurately before and after each of the Contractor's ownership changes; and

(4) Retain and continue to maintain depreciation and amortization schedules based on the asset records maintained before each Contractor ownership change.

(c) The Contractor shall include the substance of this clause in all subcontracts under this contract that meet the applicability requirement of FAR 15.408(k).

(End of Clause)

I.17 52.219-18 NOTIFICATION OF COMPETITION LIMITED TO ELIGIBLE 8(a) CONCERNS (JUN 2003) - DEVIATION

(a) Offers are solicited only from small business concerns expressly certified by the Small Business Administration (SBA) for participation in the SBA's 8(a) Program and which meet the following criteria at the time of submission of offer-

(1) The Offeror is in conformance with the 8(a) support limitation set forth in its approved business plan; and

(2) The Offeror is in conformance with the Business Activity Targets set forth in its approved business plan or any remedial action directed by the SBA.

(b) By submission of its offer, the Offeror represents that it meets all of the criteria set forth in paragraph (a) of this clause.

(c) Any award resulting from this solicitation will be made directly by the Contracting Officer to the successful 8(a) offeror selected through the evaluation criteria set forth in this solicitation.

(d) (1) *Agreement.* A small business concern submitting an offer in its own name shall furnish, in performing the contract, only end items manufactured or produced by small business concerns in the United States or its outlying areas. If this procurement is processed under simplified acquisition procedures and the total amount of this contract does not exceed $25,000, a small business concern may furnish the product of any domestic firm. This paragraph does not apply to construction or service contracts.

(2) The InfoPro Corporation will notify the MSFC/NASA Contracting Officer in writing immediately upon entering an agreement (either oral or written) to transfer all or part of its stock or other ownership interest to any other party.

(End of Clause)

I.18 52.222-42 STATEMENT OF EQUIVALENT RATES FOR FEDERAL HIRES (MAY 1989)

In compliance with the Service Contract Act of 1965, as amended, and the regulations of the Secretary of Labor (29 CFR Part 4), this clause identifies the classes of service employees expected to be employed under the contract and states the wages and fringe benefits payable to each if they were employed by the contracting agency subject to the provisions of 5 U.S.C. 5341 or 5332.

This Statement is for Information Only:
It is not a Wage Determination

A. Classification, Grades and Rates

Employee Class	Grade	Monetary Wage – Fringe Benefits Hr/Rate
Accounting Clerk I	GS-3	$11.10
Accounting Clerk II	GS-4	$12.47
Accounting Clerk III	GS-5	$13.95
Order Clerk I	GS-2	$10.18
Order Clerk II	GS-3	$10.10
Safety/Training Specialist	GS-7	$17.28
Quality Control (Mechanical Inspector)	WG-11	$20.91
Laboratory Technician	GS-6	$15.55
Manufacturing Process Planner/Estimator	WG-11	$20.91
Production Control Clerk	GS-6	$15.55
Material Expediter	WG-7	$17.46
Metal Cleaner, Immersion	WG-5	$15.55
Painter	WG-9	$19.17
Aerospace Structural Welder	WG-11	$20.91
Welder, Combination	WG-10	$20.05
Maintenance Trades Helper	WG-5	$15.55
Machinery Maintenance Mechanic	WG-10	$20.05

Machine Tool Operator	WG-9	$19.17
Sheet-metal Worker	WG-10	$20.05
CNC Programmer	WG-11	$20.91
Tool and Die Maker/Tool & Parts Attendant	WG-9	$19.17
Electronics Planner/Lead	WL-11	$23.06
Electronics Mechanic, Grade 10	WG-10	$20.05
Electronics Worker, Grade 8	WG-8	$18.28
Electronics Technician, Maintenance II	WG-9	$19.17
Engineering Technician I	GS-3	$11.10
Engineering Technician II	GS-4	$12.47
Engineering Technician III	GS-5	$13.95
Engineering Technician IV	GS-7	$17.28
Engineering Technician V	GS-9	$21.13
Library Technician	GS-5	$13.95
Technical Writer II	GS-9	$21.13
Secretary I	GS-4	$12.47
Secretary II	GS-5	$13.95
Secretary III	GS-7	$15.55
Metrology Technician I	WG-10	$20.05
Metrology Technician II	WG-11	$20.91
Metrology Technician III	WG-12	$21.74
Drafter/CAD Operator III	GS-6	$15.55
Drafter/CAD Operator IV	GS-8	$19.13

B. Fringe Benefits (applicable to all classifications)

1. Health and Insurance

Life, accident and health insurance, and sick leave programs, 25% of basic hourly rate.

2. Holidays

a. New Year's Day
b. Martin Luther King's Birthday
c. President's Day
d. Memorial Day
e. Independence Day
f. Labor Day
g. Columbus Day
h. Veterans Day
i. Thanksgiving Day
j. Christmas Day

3. Vacation or Paid Leave

a. 2 hours of annual leave each week for an employee with less than 3 years of service.
b. 3 hours of annual leave each week for an employee with 3 but less than 15 years of service.
c. 4 hours of annual leave each week for an employee with 15 or more years of service.

4. Retirement

1.5 percent of basic hourly rate plus Thrift Savings Plan plus Social Security.

(End of Clause)

I.19 52.223-7 NOTICE OF RADIOACTIVE MATERIALS (JAN 1997)

(a) The Contractor shall notify the Contracting Officer or designee, in writing, **60** days prior to the delivery of, or prior to 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).

* The Contracting Officer shall insert the number of days required in advance of delivery of the item or completion of the servicing to assure that required licenses are obtained and appropriate personnel are notified to institute any necessary safety and health precautions. See FAR 23.601(d).

(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)

I.20 52.232-18 – AVAILABILITY OF FUNDS (APR 1984)

Funds are not presently available for this contract. The Government's obligation under this contract is contingent upon the availability of appropriated funds from which payment for contract purposes can be made. No legal liability on the part of the Government for any payment may arise until funds are made available to the Contracting Officer for this contract and until the Contractor receives notice of such availability, to be confirmed in writing by the Contracting Officer.

(End of Clause)

I.21 52.222-39 NOTIFICATION OF EMPLOYEE RIGHTS CONCERNING PAYMENT OF UNION DUES OR FEE (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 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.nlrb.gov*.

(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-

(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.22 52.244-2 SUBCONTRACTS (AUG 1998) (ALTERNATE I) (JUN 2007)

(a) Definitions. As used in this clause -

"Approved purchasing system" means a Contractor's purchasing system that has been reviewed and approved in accordance with Part 44 of the Federal Acquisition Regulation (FAR).

"Consent to subcontract" means the Contracting Officer's written consent for the Contractor to enter into a particular subcontract.

"Subcontract" means any contract, as defined in FAR Subpart 2.1, entered into by a subcontractor to furnish supplies or services for performance of the prime contract or a subcontract. It includes, but is not limited to, purchase orders, and changes and modifications to purchase orders.

(b) When this clause is included in a fixed-price type contract, consent to subcontract is required only on unpriced contract actions (including unpriced modifications or unpriced delivery orders), and only if required in accordance with paragraph (c) or (d) of this clause.

(c) If the Contractor does not have an approved purchasing system, consent to subcontract is required for any subcontract that -

(1) Is of the cost-reimbursement, time-and-materials, or labor-hour type; or

(2) Is fixed-price and exceeds -

(i) For a contract awarded by the Department of Defense, the Coast Guard, or the National Aeronautics and Space Administration, the greater of the simplified acquisition threshold or 5 percent of the total estimated cost of the contract; or

(ii) For a contract awarded by a civilian agency other than the Coast Guard and the National Aeronautics and Space Administration, either the simplified acquisition threshold or 5 percent of the total estimated cost of the contract.

(d) If the Contractor has an approved purchasing system, the Contractor nevertheless shall obtain the Contracting Officer's written consent before placing the following subcontracts: **ALL INDIVIDUAL CONTRACTS WITH AN ESTIMATED VALUE GREATER THAN $500,000.00**

(e)(1) The Contractor shall notify the Contracting Officer reasonably in advance of placing any subcontract or modification thereof for which consent is required under paragraph (c) or (d) of this clause, including the following information:

(i) A description of the supplies or services to be subcontracted.

(ii) Identification of the type of subcontract to be used.

(iii) Identification of the proposed subcontractor.

(iv) The proposed subcontract price.

(v) The subcontractor's current, complete, and accurate cost or pricing data and Certificate of Current Cost or Pricing Data, if required by other contract provisions.

(vi) The subcontractor's Disclosure Statement or Certificate relating to Cost Accounting Standards when such data are required by other provisions of this contract.

(vii) A negotiation memorandum reflecting -

(A) The principal elements of the subcontract price negotiations;

(B) The most significant considerations controlling establishment of initial or revised prices;

(C) The reason cost or pricing data were or were not required;

(D) The extent, if any, to which the Contractor did not rely on the subcontractor's cost or pricing data in determining the price objective and in negotiating the final price;

(E) The extent to which it was recognized in the negotiation that the subcontractor's cost or pricing data were not accurate, complete, or current; the action taken by the Contractor and the subcontractor; and the effect of any such defective data on the total price negotiated;

(F) The reasons for any significant difference between the Contractor's price objective and the price negotiated; and

(G) A complete explanation of the incentive fee or profit plan when incentives are used. The explanation shall identify each critical performance element, management decisions used to

quantify each incentive element, reasons for the incentives, and a summary of all trade-off possibilities considered.

(2) If the Contractor has an approved purchasing system and consent is not required under paragraph (c), or (d) of this clause, the Contractor nevertheless shall notify the Contracting Officer reasonably in advance of entering into any (i) cost-plus-fixed-fee subcontract, or (ii) fixed-price subcontract that exceeds either the simplified acquisition threshold or 5 percent of the total estimated cost of this contract. The notification shall include the information required by paragraphs (e)(1)(i) through (e)(1)(iv) of this clause.

(f) Unless the consent or approval specifically provides otherwise, neither consent by the Contracting Officer to any subcontract nor approval of the Contractor's purchasing system shall constitute a determination -

(1) Of the acceptability of any subcontract terms or conditions;

(2) Of the allowability of any cost under this contract; or

(3) To relieve the Contractor of any responsibility for performing this contract.

(g) No subcontract or modification thereof placed under this contract shall provide for payment on a cost-plus-a-percentage-of-cost basis, and any fee payable under cost-reimbursement type subcontracts shall not exceed the fee limitations in FAR 15.404-4(c)(4)(i).

(h) The Contractor shall give the Contracting Officer immediate written notice of any action or suit filed and prompt notice of any claim made against the Contractor by any subcontractor or vendor that, in the opinion of the Contractor, may result in litigation related in any way to this contract, with respect to which the Contractor may be entitled to reimbursement from the Government.

(i) The Government reserves the right to review the Contractor's purchasing system as set forth in FAR Subpart 44.3.

(j) Paragraphs (c) and (e) of this clause do not apply to the following subcontracts, which were evaluated during negotiations: [ERC]

(TO BE PROPOSED BY THE OFFEROR)

(End of Clause)

I.23 52.244-6 Subcontracts for Commercial Items. (MAR 2007)

(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 $550,000 ($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 (MAR 2007) (E.O. 11246).

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

(iv) 52.222-36, Affirmative Action for Workers with Disabilities (JUN 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. Appx 1241 and 10 U.S.C. 2631) (flow down required in accordance with paragraph (d) of FAR clause 52.247-64).

(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.24 52.245-2 GOVERNMENT PROPERTY INSTALLATION OPERATION SERVICES (JUN 2007)

(a) This Government Property listed in paragraph (e) of this clause is furnished to the Contractor in an "as-is, where is" condition. The Government makes no warranty regarding the suitability for use of the Government property specified in this contract. The Contractor shall be afforded the opportunity to inspect the Government property as specified in the solicitation.

(b) The Government bears no responsibility for repair or replacement of any lost, damaged or destroyed Government property. If any or all of the Government property is lost, damaged or destroyed or becomes no longer usable, the Contractor shall be responsible for replacement of the property at Contractor expense. The Contractor shall have title to all replacement property and shall continue to be responsible for contract performance.

(c) Unless the Contracting Officer determines otherwise, the Government abandons all rights and title to unserviceable and scrap property resulting from contract performance. Upon notification to the Contracting Officer, the Contractor shall remove such property from the Government premises and dispose of it at Contractor expense.

(d) Except as provided in this clause, Government property furnished under this contract shall be governed by the Government Property clause of this contract.

(e) Government property provided under this clause:

None

(End of clause)

I.25 52.245-9 USE AND CHARGES (JUN 2007)

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

"Acquisition cost" means the acquisition cost recorded in the Contractor's property control system or, in the absence of such record, the value attributed by the Government to a Government property item for purposes of determining a reasonable rental charge.

"Government property" means all property owned by or leased to the Government or acquired by the Government under the terms of the contract. It includes both government-furnished property and contractor-acquired property as defined in FAR 45.101.

"Real property" means land and rights in land, ground improvement, utility distribution systems, and buildings and other structures. It does not include foundations and other work necessary for installing special tooling, special test equipment, or equipment.

"Rental period" means the calendar period during which Government property is made available for nongovernmental purposes.

"Rental time" means the number of hours, to the nearest whole hour; rented property is actually used for nongovernmental purposes. It includes time to set up the property for such purposes, perform required maintenance, and restore the property to its condition prior to rental (less normal wear and tear).

(b) *Use of Government property.* The Contractor may use the Government property without charge in the performance of—

(1) Contracts with the Government that specifically authorize such use without charge;

(2) Subcontracts of any tier under Government prime contracts if the Contracting Officer having cognizance of the prime contract—

(i) Approves a subcontract specifically authorizing such use; or

(ii) Otherwise authorizes such use in writing; and

(3) Other work, if the Contracting Officer specifically authorizes in writing use without charge for such work.

(c) *Rental.* If granted written permission by the Contracting Officer, or if it is specifically provided for in the Schedule, the Contractor may use the Government property (except material) for a rental fee for work other than that provided in paragraph (b) of this clause. Authorizing such use of the Government property does not waive any rights of the Government to terminate the Contractor's right to use the Government property. The rental fee shall be determined in accordance with the

following paragraphs.

(d) *General.*

(1) Rental requests shall be submitted to the Administrative Contracting Officer (ACO), identify the property for which rental is requested, propose a rental period, and compute an estimated rental charge by using the Contractor's best estimate of rental time in the formulae described in paragraph (e) of this clause.

(2) The Contractor shall not use Government property for nongovernmental purposes, including Independent Research and Development, until a rental charge for real property, or estimated rental charge for other property, is agreed upon. Rented property shall be used only on a non-interference basis.

(e) *Rental charge.—*

(1) *Real property and associated fixtures.*

(i) The Contractor shall obtain, at its expense, a property appraisal from an independent licensed, accredited, or certified appraiser that computes a monthly, daily or hourly rental rate for comparable commercial property. The appraisal may be used to compute rentals under this clause throughout its effective period or, if an effective period is not stated in the appraisal, for one year following the date the appraisal was performed. The Contractor shall submit the appraisal to the ACO at least 30 days prior to the date the property is needed for nongovernmental use. Except as provided in paragraph (e)(1)(iii) of this clause, the ACO shall use the appraisal rental rate to determine a reasonable rental charge.

(ii) Rental charges shall be determined by multiplying the rental time by the appraisal rental rate expressed as a rate per hour. Monthly or daily appraisal rental rates shall be divided by 720 or 24, respectively, to determine an hourly rental rate.

(iii) When the ACO believes the appraisal rental rate is unreasonable, the ACO shall promptly notify the Contractor. The parties may agree on an alternative means for computing a reasonable rental charge.

(iv) The Contractor shall obtain, at its expense, additional property appraisals in the same manner as provided in paragraph (e)(1)(i) if the effective period has expired and the Contractor desires the continued use of property for nongovernmental use. The Contractor may obtain additional appraisals within the effective period of the current appraisal if the market prices decrease substantially.

(2) *Other Government property.* The Contractor may elect to compute the rental charge using the appraisal method described in paragraph (e)(1) of this clause subject to the constraints therein or the following formula in which rental time shall be expressed in increments of not less than one hour with portions of hours rounded to the next higher hour: The rental charge is calculated by multiplying 2 percent of the acquisition cost by the hours of rental time, and dividing by 720.

(3) *Alternative methodology.* The Contractor may request consideration of an alternative basis for computing the rental charge if it considers the monthly rental rate or a time-based rental unreasonable or impractical.

(f) *Rental payments.*

(1) Rent is due 60 days following completion of the rental period or as otherwise specified in the contract. The Contractor shall compute the rental due, and furnish records or other supporting data in sufficient detail to permit the ACO to verify the rental time and computation. Payment shall be made by check payable to the Treasurer of the United States and sent to the contract administration office identified in the contract, unless otherwise specified by the Contracting Officer.

(2) Interest will be charged if payment is not made by the date specified in paragraph (f)(1) of this clause. Interest will accrue at the "Renegotiation Board Interest Rate" (published in the *Federal Register* semiannually on or about January 1st and July 1st) for the period in which the rent is due.

(3) The Government's acceptance of any rental payment under this clause, in whole or in part, shall not be construed as a waiver or relinquishment of any rights it may have against the Contractor stemming from the Contractor's unauthorized use of Government property or any other failure to perform this contract according to its terms

(g) *Use revocation.* At any time during the rental period the Government may revoke nongovernmental use authorization and require the Contractor, at the Contractor's expense, to return the property to the Government, restore the property to its pre-rental condition (less normal wear and tear), or both.

(h) *Unauthorized use.* The unauthorized use of Government property can subject a person to fines, imprisonment, or both under 18 U.S.C. 641.

(End of Clause)

[END OF SECTION]

PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS

SECTION J - LIST OF ATTACHMENTS

ATTACHMENT J-1

Performance Work Statement (PWS)

Introduction

This Performance Work Statement (PWS) broadly defines the requirements for Marshall Engineering Technicians and Trades Support (METTS) Services provided to the Marshall Space Flight Center (MSFC) by the Contractor. These services cover a wide range of engineering technicians and other trade skills to perform testing; ground and space based research; test operations; data analysis; machine and electrical shop operations; and other technical activities. This contract will include professionals to oversee and manage the work performed by the technical staff.

The Contractor's work on these activities is controlled by means of a Mission Services portion for work that the Government intends to remain on the contract for its duration, and by an IDIQ portion implemented through the issuance of Task Orders (TOs) for work that the Government cannot adequately define. The Mission Services contract and TOs require the Contractor to coordinate with the MSFC Directorates/Offices that exercise MSFC responsibility for the activities. MSFC Directorates and Offices are responsible for the technical excellence of MSFC managed projects, MSFC in-house projects, and technology development and application initiatives. MSFC Civil Service personnel are also deployed in support of these projects and frequent coordination between Contractor personnel and Civil Service personnel is likely. This PWS is constructed in accordance with the Level 3 Work Breakdown Structure (WBS) provided in Attachment J-3.

A Contracting Officer's Technical Representative (COTR) will be appointed for technical oversight and direction on this contract. Due to the size and complexity of this contract, Technical Monitors (TM) will also be appointed to assist the COTR in the day-to-day functions of the major areas of the contract (the Government anticipates approximately 4 civil service Technical Monitors to cover section 2.0). In addition, each IDIQ order will have a Technical Monitor appointed. This may be an existing TM or a new TM depending on the nature of the order. The TM duties will include overseeing the technical work of the Contractor in their respective work areas, ensuring that the COTR is informed of problems, and advising the COTR with respect to Contractor performance.

Scope

The Contractor shall provide all the necessary management and personnel required to perform the technical and business tasks broadly defined by the Mission Services contract and TOs issued by the Government in accordance with Clause H.4 and H.5 of this solicitation. Responses to any Task Order Requests will be in the form of a Task Order Plan (TOP). The TOPs shall be provided in accordance with Data Requirements Description (DRD) 1163MA-002, Task Order Plan. A graphical depiction of the Task Flow Process can be found in Attachment J-4. With the exception of the property listed in Clause G.6 and Attachment J-9, the Contractor shall procure all materials, supplies, incidental services, tools, and equipment necessary for the accomplishment of this PWS. Any equipment purchases must be coordinated with the COTR, Technical Monitors, and Contracting Officer and shall not include any equipment $1M in value or higher. The Contractor shall only be enabled to purchase equipment to meet the requirements of this

contract. The Contractor shall comply with NASA/MSFC regulations, policies, directives, procedures, and standards when performing all work under this PWS.

1.0 Management

1.1 Contract Management. **The Contractor shall provide the planning, coordination, technical direction, and surveillance of the activities necessary to ensure disciplined performance of work and timely and efficient application of resources for the accomplishment of all Mission Services contract work and TOs issued under the contract. The Contractor shall be responsible for maintaining communication with each supported organization and alerting the Contracting Officer's Technical Representative (COTR) and Contracting Officer (CO) immediately of any problems that would prevent meeting established objectives. A Management Plan shall be provided in accordance with DRD 1163MA-001 Management Plan.**

The Contractor shall provide an Organizational Conflict of Interest (OCI) Avoidance Plan in accordance with DRD 1163MA-009.

1.1.1 Task Management - The Contractor shall provide planning, coordination, and surveillance of overall project activities to ensure disciplined performance of work and the timely and efficient application of resources necessary for the completion of all tasks of this PWS. The Contractor shall make adjustments in the application of resources to specific WBS elements, as demands and priorities require, in consultation with the COTR. The Contractor shall develop a TOP for Task Order Requests received from the Government in accordance with DRD1163MA-002, Task Order Plan. The Contractor shall commence work once the TOP has been issued as a Task Order by the Contracting Officer.

The Contractor shall plan and conduct an informal progress review (format to be agreed upon between Contractor and COTR) scheduled as coordinated with COTR. All work being accomplished shall be addressed, by WBS element and/or Task Order, in these progress reports.

(b)(4)

1.1.2 Contractor Employee Center-wide Training and Certifications – MSFC requires certification for certain center-wide job functions (e.g., crane operator, fork truck operator, etc.; reference MWI 3410.1, "Personnel Certification Program"). For these job functions, the Contractor shall ensure that their workforce is properly certified to the MSFC standards prior to conducting any work requiring these job functions.

When performing work or operating equipment in direct support of NASA MSFC, within the Contractor's quality management system, including requirements for Industrial Safety (See DRD 1163SA-001), the Contractor shall establish, implement, and maintain a training and certification program as required to accomplish the requirements

of this PWS, reference DRD 1163QE-001. Monitoring of these training, qualification, and certification processes will be as specified in J-20, NASA MSFC Safety & Mission Assurance Surveillance Plan.

The Contractor shall keep its employees trained and certified in order to properly perform tasks requiring certification. The Contractor shall ensure all employee certifications are recorded in the MSFC CERTRAK database. Training methods include formal training and on-the-job training in order to maintain all employee levels of technical competence. Any Contractor employee authorized to operate a given test instrument or piece of equipment shall be trained on the current operating techniques of the equipment. Any Contractor request for unique training related to the specific job functions shall be approved by the COTR. Training costs approved by the COTR shall be charged to the WBS element to which it specifically supports.

The Contractor shall provide a comprehensive plan describing how they will manage all certification requirements on this contract. The certification plan shall be provided in accordance with DRD 1163SA-002, Personnel Certification Plan.

1.1.3 Contractor Employee Specialized Training and Unique Certifications – In direct support of facility unique MSFC operations under MSFC processes (facility unique OWIs, SOPs, etc.), the Contractor shall obtain specialized training and facility unique certification in all areas where required for performing a WBS element, or as directed by the COTR. The Contractor employees shall perform work in areas where certification is required only after certification is obtained, or under the supervision of an employee who has obtained certification. For unique technical capabilities where a certification program does not exist, the Contractor shall develop a certification program, to be listed in and tracked through the MSFC SHE CERTRAK database, within 90 days of contract award. All employees working in areas requiring unique certifications shall be certified and listed in the CERTRAK database within 180 days of contract award. The Contractor shall maintain all required certifications throughout the contract. As examples, within 90 days of contract award, the Contractor shall develop certification plans which will encompass certification requirements for operation of all vacuum, thermal vacuum and turbine technology, pressure systems, and instrumentation and data collection.

For facility unique operations requiring certification, the Contractor shall designate employee(s) who will serve as certification granting authorities for their specific areas of expertise. These employee(s) shall be technically competent in the areas for which they serve as the certification granting authority and approved by the COTR. Within 90 days after completion of the certification plans, all certification requirements defined in these plans, along with a list of all individuals certified to these requirements, shall be included in the MSFC SHE CERTRAK database. The MSFC SHE CERTRAK database shall be the official record of certification and the Contractor shall maintain this record to reflect current status.

The Contractor shall address specialized and unique certifications in their comprehensive certification plan. The certification plan shall be provided in accordance with DRD 1163SA-002, Personnel Certification Plan.

1.1.4 Monthly Status Reports - The Contractor shall support a formal monthly status meeting and provide a Monthly Status Report broken out by WBS element and/or Task Order, in accordance with DRD 1163MA-004, Monthly Status Report. The Monthly Status Report shall include accomplishments during the month, work upcoming for the next month, problems encountered during the reporting month, new discoveries and/or inventions. In addition, the

report shall include summaries of training, travel, overtime, consulting, procurements, and commercial work. This Monthly Status Report shall be provided to the COTR on, or before, the 10th day of each month and will cover the previous month's status. The Monthly Status Report shall not exceed two pages for each WBS element. The Contractor shall produce minutes for each of the meetings and these minutes shall include copies of all presentation charts, if applicable, and shall provide special cost analyses and projection reports, as required. Minutes shall be provided to the COTR within 5 days of meeting date.

1.1.5 Contractor Employee Clearance Document - For Contractor badged employees who no longer require access to MSFC, the Contractor shall provide verification these employees have properly cleared all accounts when the access is no longer needed. The Contractor shall establish and maintain the document in accordance with DRD1163MA-006, Contractor Employee Clearance Document.

1.1.6 Position Risk Designation for Non-NASA Employee - The position risk designation for non-NASA employees provides information necessary to determine the type of investigation required and how closely an individual is screened for a position. The Contractor shall provide the required information in accordance with DRD1163MA-007, Position Risk Designation for Non-NASA Employee.

1.1.7 Quality Systems Management - The Contractor's quality system shall be compliant to SAE AS9100 (excluding Section 7.3 "Design and Development") by transitioning from the existing quality management system within 120 days after the contract award date. The Contractor shall be verified as compliant by a MSFC audit of their quality management system to the requirements of MWI 5330.1. The Contractor shall detail their quality management system in a quality plan prepared in accordance with DRD 1163QE-001, Quality Management System Plan. The Contractor's quality management system shall be sufficiently broad in scope and cover all aspects of the technical support, testing support, and fabrication/assembly requirements of this PWS.

NASA MSFC shall approve all quality controlled special processes prior to those processes being performed to provide products to NASA and/or any other customer. Processes previously approved will be considered acceptable for use and shall be reviewed again after those documented processes have been transitioned into the Contractor quality management system format. Transition time periods for process re-approval shall be provided by NASA through the COTR.

1.2 Planning and Control

1.2.1 Work Management - The Contractor shall provide surveillance and management oversight to meet the operations of each WBS element. Each WBS element consists of diverse technical activities with unique work skills. Most WBS elements have different planning, implementing, and progress tracking systems that maintain work flow in specific work areas. The systems or processes may be manual, electronic, or both and may consist of meetings daily, weekly, or monthly.

The Contractor shall coordinate, report, and ensure the timely completion of the work specified. This encompasses the planning, coordination, technical direction, and surveillance of all activities necessary to execute all work.

a) The Contractor shall provide the overall management effort required to integrate technical and programmatic functions.

b) The Contractor shall ensure the technical excellence, cost effectiveness, and timeliness of all required work and deliverable products.

c) The Contractor shall evaluate new or used equipment to assure compatibility with directed tasks. This shall include travel to Government depots or to equipment manufacturers' or distributors' plants, as required.

1.2.2 Property Management - The Contractor shall establish and maintain a report in accordance with DRD 1163LS-001, Government Property Management Plan for all equipment, tools, etc., provided by the Government for use by the Contractor in the performance of contracted effort, and for which the Contractor has been given physical custody.

1.2.3 Technology Reports - The Contractor shall provide technical information concerning any invention, discovery, improvement, or innovation made by the Contractor in the performance of work under this contract. Technology reports shall be prepared in accordance with DRD 1163CD-002, Technology Reports.

1.2.4 Security and Information Technology - The Contractor shall incorporate appropriate safeguards to ensure the availability, integrity, and confidentiality of information and information technology resources utilized in support of this contract. Safeguards shall be commensurate with the sensitivity or criticality of the resources and shall be sufficient to minimize the risk to NASA's mission and credibility.

The contractor shall be responsible for information and information technology (IT) security when physical or electronic access to NASA's computer systems, networks, or IT infrastructure is required or when information systems are used to store, generate, process or exchange information with NASA or on behalf of NASA, regardless of whether the information resides on NASA's or a contractor's information system. At the completion of the contract, the contractor shall return all NASA information and IT resources provided to the contractor during the performance of the contract and certify that all NASA information has been purged from contractor-owned systems used in the performance of the contract. The contractor shall submit a Contractor Information Technology Security Program Plan (CITSPP) in accordance with DRD 1163CD-001.

1.2.5 Contractor Employee Travel - The Government will reimburse the Contractor for any necessary travel expenses, in accordance with the Federal Travel Regulations. The Government shall not be charged with travel expenses, unless the travel is coordinated and concurred, in writing, by the COTR prior to the beginning of the travel. Travel costs shall be charged to the WBS to which it specifically supports.

1.2.6 Contractor Employee Overtime - The Contractor shall work a five-day work week and define their work schedule within Marshall's normal work hours (6:30 AM through 5:30 PM) unless an alternate work schedule has been approved by the COTR.

Notwithstanding Clause B6, "Premiums for Scheduled Overtime," overtime for employees under WBS elements 1.0, 2.0, and 3.0 shall be coordinated with the COTR, and receive concurrence from the COTR, prior to the commencement of any overtime work. Overtime costs shall be charged to the WBS to which it specifically supports.

1.2.7 Badged Employee and Remote IT User Listing - The Contractor shall establish and maintain a report listing of all Contractor personnel working onsite at MSFC in accordance with DRD1163MA-005, Badged Employee and Remote IT User Listing.

1.2.8 Commercial Work - Upon written permission by the Contracting Officer, the Contractor may use the facilities provided under this contract for a rental fee for commercial work.

When requesting permission to use the facilities, the Contractor shall provide the following information with its request:

1). Description of the work to be accomplished
2). Estimated man hours
3). Period of Performance
4). Name of the customer
5). Amount the customer is paying the Contractor

If granted, approval to use the Government facilities will be provided on a non-interference basis with other Government work. Authorizing such use of the facilities does not waive any rights of the Government to terminate the Contractor's right to use the facilities.

The Contractor shall indemnify the Government and hold it harmless against claims for injury to persons or damage to property of the Contractor or others arising from the Contractor's possession or use of the facilities. A copy of the indemnification notice shall be included in each subcontract issued by the Contractor. The Contractor is fully liable for all damages to Government property being used for commercial purposes.

Rental rates for the facilities shall be 10 percent of each individual commercial contract. However, the Contractor may use, with the written approval of the COTR, the rates set forth in FAR 52.245-9, "Use and Charges" if the Contractor determines 10 percent to be inequitable. The Contractor shall credit future payment vouchers for rental costs incurred.

1.2.9 Contractor Procurements – Per NFS 1852.245-71, all items procured under this contract are accountable to the Government and the contractor assumes user responsibilities. The contractor shall establish a record of property procured using contract funds and transfer to the Government within 5 working days after receipt of the property. The contractor will use DD1149 (or equivalent) along with the contractor's Purchase Order (PO) and provide to the installation central receiving area prior to delivery by the vendor. The contractor will be accountable and liable for the property until it is transferred to the Government's accountability (Reference MWI 4200.1, "Equipment Control" and NFS 1852.245-71).

1.2.9.1 Operations - The Contractor shall procure general operating supplies, materials, tools and equipment necessary for the accomplishment of this PWS. Any equipment purchases must be coordinated with the COTR, Technical Monitors, and Contracting Officer and shall not include any equipment $1M in value or higher. Procurement costs shall be charged to the WBS element to which it specifically supports.

1.2.9.2 Direct - The Contractor shall procure direct materials (e.g. aluminum, titanium, stainless and carbon steels, etc) and incidental services (e.g. necessary

for completion of fabrication shop customer orders) as necessary to accomplish requirements of this PWS.

1.3 Safety, Health and Environmental. The Contractor shall establish and implement an industrial safety, health, and environmental program and provide a plan in accordance with DRD 1163SA-001, Safety, Health, and Environmental (SHE) Plan. The Contractor's industrial safety, health, and environmental program shall incorporate the following:

a) Management leadership and employee involvement

b) System and worksite analysis

c) Hazard prevention and control

d) Safety and health training

e) Environmental compliance

The Contractor shall report mishaps and safety statistics in accordance with DRD 1163SA-002, Mishap and Safety Statistics Report.

The Contractor shall follow all MSFC safety, health, and environmental regulations. Contractor personnel will engage in hazardous operations including, but not limited to, hazardous waste generation, oxygen deficiency, high voltage, confined space entry, machine shop operations, overhead crane operations, forklift operations, aerial lift operations, cryogen handling, high pressure and cryogenic systems, vertical and boom aerial lift operations, high amplitude noise exposure, and high rpm rotating objects. The Contractor shall produce, and keep current, a Job Hazard Analysis for each employee. The Contractor shall also be responsible for maintaining the data associated with each hazardous operation in MSFC's Inventory of Hazardous Operations (IHOPS) database. This requires evaluation and update of this database annually as a minimum.

In addition, the Contractor shall perform a monthly inventory to ensure all chemicals have Material Safety Data Sheets (MSDS) and are properly bar coded, inventoried, and stored per MSFC Center (MWI 8550.5) and ISO14001, or latest version, guidelines. The Contractor, as requested, shall provide an oral report at NASA team safety meetings verifying that an inventory has been completed, all MSDS notebooks have been updated, and all chemicals are properly bar coded, inventoried, and stored per MSFC Center (MWI 8550.5) and ISO14001, or latest version guidelines.

All Contractor personnel shall attend an established monthly safety meeting and document their attendance. The Contractor shall document the safety meeting attendance of employees in MSFC's Supervisor's Safety Webpage (SSWP). In addition, all Contractor supervisory personnel shall conduct a monthly safety walk through of areas under their responsibility, report their findings in SSWP, and close findings within 30 days.

1.4 Financial Reporting. **The Contractor shall utilize a financial reporting system in accordance with the NFS 1852.242-73, NASA Contractor Financial Management Reporting and NASA Policy Guide (NPG) 9501.2C, NASA Contractor Financial Management Reporting. The Contractor shall submit financial management reports in**

accordance with DRD 1163 MA-003, Financial Management Report (533M). The 533 will be reported at the Task and WBS Level(s).

This report shall summarize standard labor hours and costs, overtime labor hours and costs, Other Direct Cost (ODC) incurred, travel, training, procurements (including materials), and commercial work for each WBS by NASA Project funding code, or reporting category, as directed by the COTR.

2.0 Mission Services Technicians and Trades Support

2.1 Materials Testing. The Contractor shall perform materials testing to support NASA and MSFC missions and objectives, and shall support engineering oversight of these tests. This testing includes, but is not limited to, ignition and combustion testing on metallic and nonmetallic materials, toxic offgas testing on materials and components, thermal vacuum stability outgassing testing on materials, and advanced materials testing supporting space exploration.

2.1.1 Promoted Ignition-Combustion Testing - The Contractor shall perform the Upward Flammability of Materials in Gaseous Oxygen (GOX) testing of materials in a high-pressure gaseous oxygen environment, with both the Elevated Temperature and the Ambient Temperature Promoted Ignition-Combustion Testers. These tests are defined by Test 17 of NASA-STD-6001, *Flammability, Odor, Offgassing, and Compatibility Requirements and Test Procedures for Materials in Environments That Support Combustion*, and any variations or revisions thereof. Test pressures range from ambient pressure to 10,000 psi, with temperatures ranging from ambient to 2,200ºF. The Contractor shall lead the effort to produce any standards related to the elevated temperature test. The Contractor shall be responsible for ensuring that all equipment is properly calibrated prior to beginning a test. Any test equipment not properly calibrated shall be replaced with calibrated equipment prior to performing any test. The Contractor shall validate the test data and ensure the test data correlates with test data generated by other sources. Any test data that cannot be validated or correlated with the test data from other sources shall be immediately be brought to the attention of the COTR. This task also involves data analysis, and inputting all test data and results into the Materials and Processes Technical Information System (MAPTIS) database.

2.1.2 Flammability Testing - The Contractor shall perform Flammability and Wire Insulation Flammability Testing of materials in air and in oxygen enriched atmospheres. These tests are as defined by Tests 1, 4 and 10 of NASA-STD-6001 and any variations or revisions thereof. The Contractor shall lead the effort to produce any standards related to the elevated temperature test. The Contractor shall be responsible for ensuring that all equipment is properly calibrated prior to beginning a test. Any test equipment not properly calibrated shall be replaced with calibrated equipment prior to performing any test. The Contractor shall validate the test data and ensure the test data correlates with test data generated by other sources. Any test data that cannot be validated or correlated with the test data from other sources shall be immediately brought to the attention of the COTR. This task also involves data analysis, and inputting all test data and results into the Materials and Processes Technical Information System (MAPTIS) database.

2.1.3 Liquid and Gaseous Oxygen Mechanical Impact Testing - The Contractor shall perform Mechanical Impact for Materials in Ambient Pressure Liquid Oxygen (LOX) testing and Mechanical Impact for Materials in Variable Pressure LOX and GOX testing for materials, as

defined by Test 13A and 13B of NASA-STD-6001 and any variations or revisions thereof. The test temperature at ambient pressure is approximately -297ºF. The variable pressure test utilizes test temperatures from -297ºF to +1,000ºF, and test pressures from ambient to 10,000 psi. The Contractor shall lead the effort to produce any standards related to the elevated temperature test. The Contractor shall be responsible for ensuring that all equipment is properly calibrated prior to beginning a test. Any test equipment not properly calibrated shall be replaced with calibrated equipment prior to performing any test. The Contractor shall validate the test data and ensure the test data correlates with test data generated by other sources. Any test data that cannot be validated or correlated with the test data from other sources shall be immediately be brought to the attention of the COTR. This task also involves data analysis, and inputting all test data and results into the MAPTIS database.

2.1.4 Advanced Materials Ignition/Combustion Testing - The Contractor shall perform advanced materials ignition testing. These include: Adiabatic Compression (Pneumatic Impact) for Materials in ambient and high pressure gaseous oxygen environments, as defined by Test 14 of NASA-STD-6001; Oxygen Index Testing of materials to determine the minimum oxygen concentration that will support the combustion of a material, as defined by the American Society for Testing and Materials (ASTM) document ASTM D2863; Multimodal Friction Ignition Testing; Heat of Combustion Testing; Wire Arc Tracking Testing; Puncture Testing; Reactivity in Aerospace Fluids Testing; and Autogenous Ignition Temperature Testing of materials to determine the temperature at which a material will spontaneously ignite without the presence of a spark or open flame, as defined by ASTM G72. This task shall also include the development and utilization of new test equipment and the development of new test methods. The Contractor shall lead the effort to produce any standards related to the elevated temperature test. The Contractor shall be responsible for ensuring that all equipment is properly calibrated prior to beginning a test. Any test equipment not properly calibrated shall be replaced with calibrated equipment prior to performing any test. The Contractor shall validate the test data and ensure the test data correlates with test data generated by other sources. Any test data that cannot be validated or correlated with the test data from other sources shall be immediately be brought to the attention of the COTR. This task also involves data analysis, and inputting all test data and results into the MAPTIS database.

2.1.5 Thermal Vacuum Stability (Outgassing) Testing

The Contractor shall perform Thermal Vacuum Stability Testing of materials to determine the characteristics of materials when exposed to vacuum conditions, as defined by the Johnson Space Center (JSC) document SP-R-0022/ASTM-E-595, and any variations thereof. The Contractor shall lead the effort to produce any standards related to the elevated temperature test. The Contractor shall be responsible for ensuring that all equipment is properly calibrated prior to beginning a test. Any test equipment not properly calibrated shall be replaced with calibrated equipment prior to performing any test. The Contractor shall validate the test data and ensure the test data correlates with test data generated by other sources. Any test data that cannot be validated or correlated with the test data from other sources shall be immediately brought to the attention of the COTR. This task also involves data analysis, and inputting all test data and results into the MAPTIS database.

2.1.6 Toxic Offgassing (Toxicity) Testing - The Contractor shall perform Toxic Offgassing Testing of materials and assembled articles. Toxicity testing includes the *Determination of Combustion By-Products from Upward Flame Propagation Testing*, *Determination of Offgassed*

Products and *Determination of Offgassed Products from Assembled Articles*. These tests are defined by Tests 7 and 16 of NASA-STD-6001 and any variations or revisions thereof. The Contractor shall lead the effort to produce any standards related to the elevated temperature test. The Contractor shall be responsible for ensuring that all equipment is properly calibrated prior to beginning a test. Any test equipment not properly calibrated shall be replaced with calibrated equipment prior to performing any test. The Contractor shall validate the test data and ensure the test data correlates with test data generated by other sources. Any test data that cannot be validated or correlated with the test data from other sources shall be immediately brought to the attention of the COTR. This task also involves data analysis, and inputting all test data and results into the MAPTIS database.

2.1.7 Test Sample Verification and Preparation - The Contractor shall perform a complete analysis on each test sample received for the testing to ensure that the information is complete and accurate. The Contractor shall verify that each sample sent for testing has all of the information needed for identification, and that all of the information is accurate. This sometimes requires coordination with the test requester, the materials supplier, the manufacturer, and other sources. The Contractor shall also prepare each required test sample in the form in which it is needed, including substrate preparation, sample curing and sample sizing. The collected information shall be entered into the MAPTIS database. This database is currently used by the Government for the management and tracking of all work under PWS 2.1. The Contractor shall receive notification from the requester indicating if the sample and data are to be labeled as one of the following: Sensitive but Unclassified (SBU); Proprietary; International Trafficking in Arms (ITAR); Export Administration Regulations (EAR) or other security related classification. The data shall be appropriately labeled. The samples and data shall be tracked and protected in accordance with NASA guideline and procedures.

2.1.8 Engineering Analysis of Materials Testing, Data, and Results - The Contractor shall perform engineering analyses for the areas covered under this PWS element and any Task Orders developed. This effort includes analysis of test setups, test procedures, and data generated by the testing. These engineering analyses shall ensure that test data is generated using existing organizational instructions, and the data is either consistent with previous test data or valid explanations exist why anomalies have occurred. The Contractor shall receive instructions from the requester indicating if the sample and data are to be labeled as one of the following: Sensitive but Unclassified (SBU); Proprietary; International Traffic in Arms Regulations (ITAR); Export Administration Regulations (EAR); or other security related classification. The data shall be appropriately labeled. The samples and data shall be tracked and protected in accordance with NASA guideline and procedures.

2.1.9 Test Innovations - The Contractor will strive to provide innovations and improvements to the existing ways of performing tasks and interpreting data for the testing covered under this PWS. These tasks include analysis of MSFC produced test data, analysis of test data from other sources, application requests and systems evaluations. The Contractor shall maintain sufficient skill and knowledge of the test capabilities to provide technical expertise and guidance to MAPTIS database personnel for data approval and data entry.

2.1.10 Oxygen Compatibility Assessments - The Contractor shall perform oxygen compatibility assessments. These assessments are conducted for the safe operation of oxygen systems for NASA and/or private industries. The Contractor shall perform an Oxygen

Compatibility Assessment, also known as Oxygen Hazards Analysis, for an oxygen system or component. Upon completion, the Contractor shall provide a complete analysis in final presentation form as agreed upon with the COTR. The Contractor shall maintain sufficient skill and knowledge of an Oxygen Compatibility Assessment to provide necessary technical guidance or expertise.

2.1.11 Development of Internal, Scientific and Data Documentation and Publications

The Contractor shall create scientific, technical and data documents, and internal documentation and publications as needed and as directed by the COTR. The documents required include research papers to be published by scientific organizations, periodical sections, newspaper articles, failure analyses, problem assessments, problem resolutions, anomaly investigations, preferred materials applications documents, data explanation documents, technical evaluation documentation, and other similar scientific and engineering documentation. The Contractor shall also create needed internal documentation, which include Organizational Instructions, safety documents and communications documentation. The Contractor shall work with the MSFC printing office to ensure that all documents are in the proper format, printed properly and delivered when required. The Contractor shall also be responsible for supporting the distribution effort of all documents created under this task.

2.1.12 Materials Research and Special Studies - The Contractor shall use supplemental research tasks to fill any available time when employees and equipment are not fully utilized for testing and analysis in WBS elements 2.1.1 through 2.1.11, or for commercial work. The Contractor shall conduct materials research in areas related to this PWS and have research tasks ongoing at all times. The Contractor shall also perform research and special studies for other materials and processes disciplines, when directed by, or with the approval of, the COTR. These research and special studies shall enhance the general knowledge base of the scientific community. The Contractor shall publish the research in readily available publications and in a format used by the specific publication or by the scientific community. Acceptable publications include periodicals and standards published by nationally recognized organizations, such as the Society of Automotive Engineers (SAE), ASTM International, the International Organization for Standardization (ISO), and the American Society for Materials (ASM) International, or other as approved by the COTR. The Contract shall, when directed by the COTR, present these publications at meetings, conferences, symposia, etc.

2.2 ETF/EFDTF Test Support. The Contractor shall operate and maintain MSFC's Environmental Test Facility (ETF) and Experimental Fluid Dynamics Test Facility (EFDTF). Environmental and fluid dynamics test activities are planned and executed in these facilities to support the design, development, certification, and operation of flight structures, payloads, systems, and components.

Testing performed at the ETF requires frequent, around-the-clock operations. During these periods, with approval of the COTR, alternate work schedules shall be established to support weekend and second and third shift operations.

2.2.1 Planning and Control - The Contractor shall ensure the planning, coordination, technical direction, and surveillance of all activities necessary to execute all Customer Test Requests (CTR) issued for these facilities. In doing so, the Contractor shall possess and provide technical expertise on all ETF test chambers and EFDTF facilities. Currently, the

Government uses a Test Preparation Sheet (TPS) (reference ET01-PRO-OWI-003, Test Preparation Sheet Instructions) to direct the contractor to perform technician work. The Contractor shall:

a) Oversee test operations and perform personnel scheduling to maintain a sufficient number of Contractor employees overseeing the facilities and test equipment to complete testing safely and on schedule.

b) Coordinate contract personnel to ensure an adequate skill mix when supporting frequent, around-the-clock testing in the Environmental Test Facility.

c) Maintain and track a sufficient inventory of supplies, materials, tools and equipment required to perform the requirements of PWS 2.2.

d) Ensure all technician personnel have the autonomy to immediately report testing anomalies, chamber concerns, or operational concerns directly to the Civil Service Point of Contact (POC).

e) Support Civil Service personnel at all Test Readiness Reviews and other customer meetings as requested by the COTR.

f) Ensure the technical excellence, cost effectiveness, and timeliness of all required work and deliverable products.

g) Ensure that when performing second or third shift operations there is a senior, designated technical person in a position of authority.

The Contractor shall support MSFC personnel in planning facility maintenance and chamber, equipment, and facility upgrades to complement customer support. This shall include, but not be limited to, test facility, chamber, and equipment installation and modification, test facility, chamber, and equipment relocation, test facility, chamber, and equipment refurbishment, and test, chamber, and equipment facility teardown.

The Contractor shall be responsible for maintaining a clean and organized work environment within ETF and EFDTF work areas. This shall include supporting major, facility-wide cleaning actions.

2.2.2 Maintenance and Repair - The Contractor shall be responsible for implementation of the preventive maintenance program. It is anticipated that preventive maintenance will primarily be performed during non-test periods. The Contractor shall perform and document preventive maintenance per procedure requirements.

2.2.3 Test Coordination and Scheduling - The Contractor shall be responsible for scheduling tests and providing cost information necessary for the ETF and EFDTF business office to provide the customer with a cost estimate for testing. The Contractor shall be the initial point of contact for customers requesting testing in the ETF and serve as a liaison between customers and ETF POCs. The Contractor shall make an initial determination of which test chamber best fits the customer's needs, then coordinate testing arrangements between the MSFC chamber POC and the customer. The Contractor shall maintain all ETF test schedules and resolve any conflicts between test schedules. The Contractor shall be responsible for providing a Customer Test Request (CTR) to potential customers, receiving completed CTRs

from the customers, and providing CTRs to chamber POCs. Using the CTR, the chamber POC generates a TPS to initiate the necessary work to conduct the test. The Contractor shall support Civil Service personnel at all Test Readiness Reviews and other customer meetings, as requested. The Contractor shall be responsible for coordinating access to MSFC between the customer and MSFC Security. The Contractor shall conduct guided tours for potential customers and tour groups as requested by Civil Service management.

The Contractor shall maintain a master ETF, EFDTF, and Structural Test Facility combined testing schedule. The Contractor shall give an oral presentation of the test schedule at weekly ETF and EFDTF team meetings.

The Contractor shall be responsible for coordinating, developing, and producing placards, brochures and leaflets describing the ETF's and EFDTF's technical capabilities. This includes, but is not limited to, working with MSFC Graphics in developing page layouts, generating computer graphics, and coordinating with MSFC photographers. All placards, brochures, and leaflets shall be approved by MSFC Graphics prior to production.

The Contractor shall develop presentation charts, as requested, by ETF and EFDTF personnel, and directed by the COTR.

The Contractor shall provide coordination support for onsite and off-site meetings and conferences. The Contractor shall escort foreign nationals and support all visits by foreign nationals. This will require special security training for Contractor personnel performing this function.

2.2.4 ETF Chamber Operations and Support - The Contractor shall perform all test chamber operations within the ETF and perform the mechanical, electrical, welding, machining, refrigeration (including cascade), helium leak detection and other work that supports testing. This includes, but is not limited to, chamber and support equipment installation and buildup, chamber and support equipment maintenance and preventive maintenance, instrumentation installation and checkout, test support fabrication and setup, data acquisition and reduction, equipment calibration, video monitoring, test article handling, and the installation and use of high-pressure and cryogenic systems. In the past, this work has required technicians with ancillary skills including, but not limited to, machining, welding, soldering, refrigeration, leak checking, electrical wiring (high and low voltage), pipe fitting, instrumentation, data acquisition, helium leak detection and sheet metal.

The Contractor shall provide engineering expertise, including guidance for, and operation of, the thermal chambers located in MSFC's ETF. The Contractor, as a minimum, shall maintain expertise in facility layout and design with an emphasis on electrical systems; create and maintain MicroStation® CAD drawings (electrical and mechanical) of all ETF test facilities; maintain the ETF's repository of specific facility engineering drawings; maintain proficiency in data acquisition and control systems for all thermal test systems with the ability to manage the data systems and retrieve data.

The Contractor shall, within 60 days of contract award, develop and maintain a certified Welding Program to include the ability/capability of Gas Tungsten Arc Welding (GTAW) in accordance with the American Welding Society (AWS). This requires the Contractor to be certified by an independent, third party. The program, as a minimum, shall include:

a) A Weld Procedure Specification (WPS), Procedure Qualification Record (PQR), and a Welding Operator Qualification (WPQ) Test (Welding Position 6G)) for each of the following:

   Base Metals P- No.1 to P- No.1 (Carbon Steel to Carbon Steel) and Base Metals P-No.8 to P- No.8 (Stainless Steel to Stainless Steel) for Pipe Diameters of 1.00" & Larger, Base Metal Groove of 0.0625"-0.436" (Wall Thickness).

b) A Welder/Welding Operator qualified and certified to the stated WPSs in the 6G Welding position.

2.2.5 EFDTF Facilities Operations and Support -The Contractor shall build-up models or test items in the EFDTF with instrumentation that is tested and measured in the facilities. The Contractor shall install and connect models to the test fixtures and record data during tests. The Contractor shall configure the chamber elements and facilities to accommodate the test requirements and perform maintenance between runs. In the past, this work has required technicians with ancillary skills including, but not limited to, CAD drafting, machining, welding, soldering, refrigeration, leak checking, electrical wiring (high and low voltage), pipe fitting, instrumentation, data acquisition, and sheet metal work.

2.3 Structural Test Support. The Structural Test Facility is a high bay facility complex that provides office space, laboratory space, test cells, machine shop, fabrication areas, material handling systems, load control systems, data acquisition systems, and utilities to support aerospace structural testing. Structural strength test and dynamic load test activities are planned and executed in this facility to support the design, development, certification, and operation of flight structures, payloads, systems, and components. Although Structural Strength Test and Structural Dynamics Test are regarded as separate engineering disciplines at MSFC, the personnel and facility resources for these engineering disciplines are co-located within the Structural Test Facility. In some cases, other facilities at MSFC may be utilized for structural testing operations when test article size, test hazards, or other specific test requirements preclude test operation at the Structural Test Facility.

Structural Strength testing is an engineering discipline involved primarily with the application of static or quasi-static loads (e.g., mechanical, thermal, pneumatic) to aerospace hardware in an effort to accurately determine the hardware response to such loading (e.g., deflection, stress, strain). Structural Strength testing is primarily performed in the Structural Test Facility located in Building 4619 at MSFC. There are numerous structural test positions within the Structural Test Facility. Each test position has specific test capabilities with regard to load application limits (tensile load, compressive load, shear load) and test article size. Structural Dynamics testing involves investigation into the dynamic response of structures during the application of various types of loads. The Structural Test Facility has dedicated test areas for vibration, acoustic, modal and shock testing.

2.3.1 Structural Test Facility Planning and Control - The Contractor shall be responsible for daily planning, coordination, and technical direction of Contractor activities performed at the Structural Test Facility. The Contractor shall be responsible for coordinating daily with Structural Test Facility engineers and management as required to ensure that Contractor personnel are utilized in a cost effective and productive manner to fully support Structural Test Facility priorities and objectives. Currently, the Government uses a Test Preparation Sheet (TPS) (reference ET01-PRO-OWI-003, Test Preparation Sheet Instructions) to direct the contractor to perform technician work.

2.3.2 Structural Test Facility Support - The Contractor shall provide technician support for all structural strength and structural dynamics work activities managed through the Structural Test Facility whether work is performed at the Structural Test Facility or at MSFC on-site test facilities. The scope of this WBS includes technician support required for maintenance, upgrade, modification and refurbishment of existing Structural Test Facility systems and equipment. This work also involves support during test buildup and test operations, and support during buildup and fabrication of new facility capabilities required to accomplish the mission of the Structural Test Facility. Typical work activities include, but are not limited to:

- power hand tool operation (drills, metal cutting saws, etc.)
- power equipment/machining operations (drill press, table saws, CNC mills and lathe, manual mills and lathe, metal cutting band saw, etc)
- hydraulic pump maintenance, troubleshooting and operation
- load control system maintenance, troubleshooting and operation
- vacuum system maintenance, troubleshooting and operation
- pneumatic system maintenance, troubleshooting and operation (air, GN2, helium, hydrogen, etc.)
- cryogenic system maintenance, troubleshooting and operation (LN2, LH2, LHe)
- electrical wire termination
- electrical cable fabrication
- tensile test machine maintenance, troubleshooting and operation
- material handling, mobile crane operation, bridge crane operation, aerial lift operation, fork lift operation
- rigging operations required to support lift operations
- data system operations support (fabricating drag-on cables, wiring termination, etc)
- data sensor installation (pressure transducers, strain gages, temperature sensors, load cells, etc)
- welding operations (MIG, TIG, stick)
- digital audio/video equipment installation and operation

2.3.3 Master Schedule - The Contractor shall maintain a master Structural Test Facility, ETF, EFDTF combined testing schedule.

2.4 Fabrication and Assembly of R&D Space Flight and Associated Hardware. The Contractor shall perform fabrication and assembly of R&D products that are within MSFC's manufacturing capability. The manufacturing capability is defined as R&D hardware products and manufacturing processes for MSFC in-house designs that require close and continual collaboration with design personnel, development of manufacturing processes, or are schedule critical.

The Contractor shall perform tasks that will consist of manufacturing R&D space flight hardware and experiments, flight ground support hardware and equipment, test fixtures (dynamic, thermal vacuum, and structural), and prototype/mockup hardware or end items made from various materials. The tasks may also require refurbishment (re-machining, reprocessing, and/or cleaning) of existing hardware.

MSFC is transitioning to Digital Design to Fabrication (DDTF). The Contractor shall have knowledge of DDTF, which includes the ability to accept and read CAD models from a variety of CAD/Modeling systems housed in a common Product Data Management (PDM) configuration system, and understand the datum to cost and plan. The Contractor shall have expertise in

geometric dimensions and tolerances (GD&T). The Contractor shall provide a skill mix that includes both traditional and DDTF cost estimating and planning to meet the technical requirements of this contract.

The Contractor shall establish, implement, and maintain a system for reporting performance in accordance with DRD1163MA-007, Monthly and Semi-Annually Performance Reports.

2.4.1 Precision and General Assembly - The Contractor shall perform precision and general assembly in the open shop and in environmentally controlled clean rooms on both flight experiment hardware and test hardware. Some assembly operations require adhesive bonding technology.

2.4.2 Machining - The Contractor shall perform machining processes which shall consist of, but not be limited to, operations performed on lathes, mills, grinders, shapers, and electrostatic discharge machines. Selected machines are computer numerically controlled (CNC) and can be programmed both off- and on-line. Machining and grinding operations frequently require dimensional control to less than .001 inch. Foam machining shall include operation of conventional or CNC equipment in the foam shop or controlled areas of the primary machine shop. As a minimum, the Contractor shall be capable of operating a four machining centers at one time and ensure the machining centers are manned while operating.

2.4.3 Sheet Metal - The Contractor shall perform sheet metal processes which shall consist of, but not be limited to, operations requiring shearing, bending, punching, and fastening. The Contractor shall fabricate high and low-pressure metal tubing and flexible hose systems.

2.4.4 Surface Treatment - The Contractor shall perform surface treatment operations which shall involve, but not be limited to, glass bead/sandblasting operations, acid and alkaline metal etching, painting (spray and brush), chemical passivation, and chemical phosphate metal treatment. Electrochemical metal processing shall involve, but not be limited to, anodizing and electroless nickel plating processes. Various other plating processes may be required but only at the direction of the Technical Monitor. Cleaning processes are conducted using special chemicals. Some precision cleaning processes require particulate and nonvolatile residue sample preparation. The Contractor shall be responsible for emptying containers of spent chemical into Government-furnished receptacles or into neutralization processing tanks. The Government shall be responsible for all disposal activity including waste/waste water permits. As a minimum, the Contractor shall have the capability to provide minimal services of surface treat, precision cleaning and painting at one time.

Dry-film lubrication application shall consist of all the functions necessary to pre-treat material and apply and burnish various solid (dry film) and liquid lubricants. These lubricants shall include, but not be limited to, un-bonded solids (granular or powdered) and resin-bonded solids.

2.4.5 Welding and Heat Treatment - The Contractor shall perform fusion welding operations which shall consist of, but not be limited to, metallic inert gas, tungsten inert gas, electron beam, and plasma arc and resistance and electrostatic discharge processes. Brazing processes shall consist of, but not be limited to, acetylene and vacuum oven techniques. The Contractor shall conduct heat treatment operations in electric and gas heated ovens and furnaces using controlled (vacuum and special gases) and non-controlled environments.

2.4.6 Fabric Shop - The Contractor shall provide, on a very limited basis, services that include a fabric shop. Fabric shop tasks primarily consist of, but are not limited to, fabrication of banners, curtains, safety harnesses, lifting slings, and multi-layer insulation (MLI) blankets. The Contractor shall lay-up, sew, ultrasonically weld, bond, and inspect as specified on the Customer Order. Some special items require fabrication in a clean room environment.

2.4.7 Maintenance - The Contractor shall provide mechanical and electrical/electronic maintenance to maintain shop equipment furnished by the Government. This shall include, but not be limited to, mechanical controls in the machine shop, sheet metal shop, heat treatment area, surface treatment area, precision cleaning area, and welding shop. The Contractor shall provide machine coolant servicing to consist of, but not limited to, replenishing, replacing, and reclaiming the machine coolants as required in the fabrication shops. Excessing, repair and/or replacement of equipment shall be approved by the Technical Monitor.

2.4.8 Calibration - The Contractor shall use Government-furnished software to track and maintain calibrated equipment. Onsite MSFC calibration service is available for use as needed. As directed by the COTR, the Contractor may utilize approved outsource calibration services. Records of contracted services shall be maintained in the Contractor's record center.

2.4.9 Chemical Analysis - The Contractor shall perform sample collection, analysis, and reporting as described below:

a) Monitor by chemical analysis all chemical tanks and rinse tanks in buildings 4760 and 4705 used in various plating, degreasing, etching, cleaning, and dye processes. These tanks shall be strictly monitored to assure that chemical parameters adhere to the requirements.

b) The Contractor shall analyze the various solvents/fluids used in the precision cleaning facility in building 4705 for non-volatile residue and particle count to certify cleanliness of the aerospace hardware.

c) The Contractor shall evaluate JP-8 fuel according to Military Specification, MIL-T-83133, Turbine Fuels, Aviation, Kerosene Types, NATO Code Numbers F-34 (JP-8) and F-35. The Contractor shall inspect for the presence of algae according to a demonstrably reliable method selected by the Contractor.

d) The Contractor shall analyze hydraulic oil per MIL-PRF-83282, Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft Metric, NATO Code Number H-537, moisture per Karl Fischer method or equal, and for particulate.

e) The Contractor shall ultrasonically clean liquid oxygen filters, run Nonvolatile residue (NVR) and particulate count, and report results prior to normal precision cleaning.

2.4.10 Quality Control -

a) The Contractor's quality department shall provide layout, in-process, and final inspection to ensure that all requirements are met.

b) The Contractor's quality department shall prepare an Acceptance Data Package (ADP) for each Deliverable End Item (DEI) products. The ADP shall provide the Government with the documentation necessary to determine the acceptability of products as specified in the DEI work request. The ADP shall be prepared, maintained, and/or delivered in accordance with the requirements of DRD 1163CM-001, Acceptance Data Package.

c) The Contractor's quality department shall be the primary interface with the Government quality assurance organization. The Government quality engineering organization shall provide project level quality inspection and test requirements prior to fabrication and assembly of quality sensitive hardware. The Government quality assurance organization will perform mandatory inspection points (MIPs) as specified by the Government quality engineering organization on quality sensitive Products.

d) For all shop operations of quality sensitive products, certification/qualification shall be required for all personnel controlling special processes and performing fabrication and inspection operations of a specialized nature. The Government will provide the requirements for applicable certifications.

e) The Contractor shall request, through the Technical Monitor, Government support for x-ray nondestructive evaluation (NDE) inspections when specialized inspection equipment already exists within other Government organizations.

   All NDE inspections performed by NASA shall be verified by the NASA MSFC quality assurance organization or other work request designated personnel prior to return of the articles and materials for further processing by the Contractor.

   The Contractor, when requested by the COTR, shall provide ultrasonic, magnaflux and dye penetrant for non-destructive evaluation (NDE) inspections.

f) The Contractor shall support a Functional Configuration/Physical Configuration Audit Documentation process. This process is known as FCA & PCA respectively and shall be governed by DRD 1163CM-002, Functional Configuration/Physical Configuration Audit Documentation.

The Contractor shall classify nonconformities for all products as either "Minor" or "Major." Minor nonconformities shall be defined as a nonconformance that involves a single occurrence in failing to meet a requirement that does not affect a safety related characteristic or for equipment/tooling failure. Major nonconformities will consist of all other nonconformities, including nonconformities as a result of a trend analysis. A correction action process shall be required for all major nonconformities that shall be verified as effective in preventing the nonconformity from reoccurring. The Contractor shall document all product and Quality Management System (QMS) nonconformities in Contractor's QMS.

Discrepancies for quality sensitive products that are for "Rework" shall be documented on a NASA MSFC SQUAWK Tag (MSFC Tag 6). All other quality sensitive product nonconformities shall be documented on a MSFC Discrepancy Record (MSFC-Form-460) or equivalent including rework when deemed necessary. The process shall also be documented within VISUAL Manufacturing™ (VM).

For non-quality sensitive products, non-conformances shall be documented within VISUAL Manufacturing™.

All dispositions except “rework” shall be approved by NASA by submittal of a Deviation Approval Request (DAR), MSFC-FORM-847 and instructions; or through a Material Review Board (MRB) process on the Contractors discrepancy record, as specified by MPR 8730.3 and by the designated project level representative.

The Contractor shall be responsible, when applicable, for material certification of all materials used to fabricate quality sensitive hardware and other hardware when specified on the Customer Order. This shall include, but not be limited to, requests for Government certification, certification from commercial sources, or spectrographic analysis using Government-furnished equipment (GFE). The Contractor shall verify raw material test reports for both chemical composition and tensile strength in conjunction with SAE AS9100, paragraph section 7.4.3 and/or as requested by the NASA quality assurance organization through the COTR. The current raw material testing verification process shall be approved by NASA. When requested, material certification records shall be part of the acceptance data package maintained in the Contractor’s record center. The Contractor shall investigate MSFC or vendor Alerts on materials and hardware when requested by the COTR.

The Contractor shall maintain an optical alignment, weight, and center of gravity capability.

The Contractor’s subcontracts shall comply with the applicable portions of the Contractor’s approved internal ANSI/ISO/ASQC Q9001:1994 or Q9001:2000 requirements. The Contractor shall utilize the MSFC Audited Vendor List (AVL).

1) All subcontracts let for quality sensitive products shall utilize the MSFC supplier listings as identified for use in MWI 5330.1, section 6.2 and the links herein:

   AVL: Audited Vendor List
   LVL: Limited Vendor List
   PSAL: Project Specific Approved Supplier List

   AVL: https://msfcsma3.msfc.nasa.gov/dbwebs/apps/lvl/default_avl.asp

   LVL: https://msfcsma3.msfc.nasa.gov/dbwebs/apps/lvl/default.asp

   PSASL: https://msfcsma3.msfc.nasa.gov/dbwebs/apps/lvl/default_psasl.asp

2) All non-quality sensitive products subcontracted proposed suppliers that are not on the above referenced supplier lists (AVL, LVL, PSAL) shall be specified by the NASA product requester and evaluated for their ability to meet purchase requirements by the Contractor based on the information provided by the requester on the supplier. Supplier use for these products shall be limited to articles and materials purchased for the specific work request. If the Contractor feels that the submitted supplier cannot meet the requirements of the purchase order, coordination for resolution shall be requested through the designated project level representative.

2.4.11 Planning and Control - The Contractor shall plan, schedule, track, and status manufacturing tasks through the fabrication shops.

The Contractor shall perform manufacturing planning to accomplish the requirements of the Customer Orders. The Contractor's planning department shall coordinate problems through the Technical Monitor and ensure "as-built" configuration agrees with the "as-designed" configuration. In addition, the Contractor's planning department shall be the primary interface between the Technical Monitor and the Contractor's other organizational departments for information, status, schedules, and estimates relative to the Customer Orders.

The Contractor shall use Government-owned "Micro" from Estimating Systems, Inc ™ to perform estimates for Customer Orders. The current Government provided seat subscriptions are fully subscribed in the fabrication shop area. Integrated with Micro is the CAD package SolidWorks ® by SolidWorks Corporation for CAD model acceptance. The current Government provided seat subscriptions are fully subscribed in the fabrication shop area.

The Contractor shall perform production control functions as necessary to accomplish the requirements of both the Customer Order and Work Order. The Contractor shall provide accurate and reliable Work Order status and schedule information when requested by the COTR. The Contractor's production control shall assign manpower allocations to all approved Customer Orders.

The Contractor shall operate and maintain the storeroom. This task shall include, but not be limited to, inventory control, receipt, issue, storage and handling of hardware, parts, and materials for both the Government and Contractor.

The Contractor shall not be responsible for any Program Critical Hardware (PCH) handling or moves. When PCH handling or moves becomes necessary, the Contractor shall be responsible for coordinating the move with the Government and the Government's contractors that provide this service. The Contractor shall also request assistance for oversized equipment moves from the Government when such moves are required. The Contractor shall provide certified forklift and crane operators for handling normal equipment and material moves in their areas of responsibility.

The Contractor shall provide proof-load capability for lifting slings and fixtures used in normal material and hardware handling operations within the Contractor's work area. The Contractor shall request through the Technical Monitor support from the Government for proof-loading of oversized lifting slings and fixtures when applicable.

The Contractor shall operate and maintain the tool crib and inventory system utilizing CribMaster™. The current Government provided seat subscriptions are fully subscribed in the fabrication shop area. This shall include, but not be limited to, the identification and bar coding of each tool room item, issuing and tracking tool withdrawals, purchasing supplies and materials for the tool crib including new and replacement tools, performing periodic inventories, and providing reporting.

The Government-owned online computer system is VISUAL Enterprise 6.3.8 software application. The Government is responsible for maintaining this software package with all seats currently fully subscribed in the managing of the fabrication shop area only. The current modules used within Visual Enterprise are: Manufacturing, Automated Material Tracking System, Automated Labor Tracking System, and Visual Quality Data Collection Seats.

The Contractor shall use VM to manage the planning, tracking, scheduling, procuring, and inventorying of parts and work flow through the fabrication shop. The VM major functional areas

are Quotations, Customer Order Entry, Engineering Definition (Routing and Bill of Material), Production Planning, Material Planning, Scheduling, Shop Floor Barcode Control, Job Costing, Purchasing (both to the Work Order and Inventory), Inventory Control, Shipping, Invoicing, and Customer Inquiry.

The following details the work processing procedures currently used by the Government to request services from the Contractor and how the work is monitored and accepted.

Fabrication services receive requests for fabrication and assembly tasks on a MSFC Form 3751 (Fabrication Request). Once requirements are clearly identified, a Government Manufacturer Engineer (ME) will develop the requirements for and issue a Customer Order in Visual Manufacturing™ (VM). The Contractor utilizes the issued Customer Order and Form 3751 to define the hardware configuration, quantity, documentation, GFE, end-item disposition, any other special requirements, estimated cost and delivery date. All Customer Orders are approved by the Technical Monitor. The Technical Monitor may delegate authority to the MEs.

The Contractor reviews the Customer Order and documentation package, plans, coordinates, procures parts and materials, and generates a Work Order (WO) in VM. The Contractor's planning department is the primary interface between the MEs and the Contractor's other organizational departments for information, status, schedules, and estimates.

The WO package is routed to the Contractor's Production Control (PC) department, where work is assigned and scheduled with the proper manufacturing groups. The PC department monitors the fabrication and assembly work process, expedites moves from shop station to shop station, and coordinates inputs to accomplish the requirements of both the Customer Order and WO.

The Contractor fabricates and/or assembles, inspects and verifies that hardware meets the requirements of the Customer Order, WO and design drawing documentation.

Upon completion of the Customer Order requirements, the Contractor transfers the Deliverable End Item (DEI) along with the Acceptance Data Package (ADP) to the fabrication services storeroom. Storeroom personnel notify the customer and obtain the signature of the individual picking up the completed item(s).

The Contractor shall use the following Government provided software packages for job simulation and for "computer-aided manufacturing." Detailed specifics of suites and modules are to be verified by the Contractor.

a) Delmia — Machine Tool Builder
Machine Tool Path Simulation

b) ICAM Software — D-M5 CAM-POST

c) CATIA v5 — Manufacturing
(a) Design and Advanced Machinist
(b) Lathe Machining
(c) Prismatic Machining Preparation Assistant

2.5 Electrical Fabrication, Test, and Assembly.

2.5.1 Fabrication - The Contractor shall perform electrical fabrication, which typically involves, but is not limited to, hand soldering, printed circuit board population, automated assembly of surface mount technology, strain gage installation, coil winding, electrical cable harness assembly, potting, staking, conformal coating, fiber optics assembly, and electrical/mechanical "black box" assembly. Selected items of electrical work require electrostatic protection of electrically sensitive components during processing.

2.5.2 Testing - The Contractor shall perform electrical testing, which typically involves, but not limited to, various testing methods and techniques on Electrical, Electronic and Electromechanical (EEE) parts, components, sub-systems and systems. These tests include; functional acceptance tests of EEE parts before board population; electrical integrity tests of flight and Ground Support Equipment (GSE) cable assemblies to ensure proper wiring, isolation and workmanship; and the electrical acceptance tests of flight and engineering hardware. The Contractor shall perform fabrication and test of GSE and special test equipment (STE), operation of automated test systems, fabricate and test prototype circuit boards, interconnecting cables, control boxes and breakout boxes, with fabrication and testing supporting GSE and Flight Hardware.

2.5.3 Assembly - The Contractor shall perform precision and general assembly in the open shop and in environmentally controlled clean rooms on both flight experiment hardware and test hardware. Some assembly operations require adhesive bonding technology.

2.5.4 Calibration - The Contractor shall use Government-furnished software to track and maintain calibrated equipment. Onsite MSFC calibration service is available for use as needed. As directed by the COTR, the Contractor may utilize approved outsource calibration services. Records of contracted services shall be maintained in the Contractor's record center.

The Contractor shall ensure all non-quality items fabricated for commercial customers shall be inspected by non-contract personnel prior to customer delivery.

2.5.5 Quality Control - The Contractor shall ensure all quality sensitive items fabricated for commercial customers shall be procured and inspected through a Space Act Agreement.

The Contractor shall ensure all subcontracts comply with the applicable portions of the Contractor's approved internal ANSI/ISO/ASQC Q9001:1994 or Q9001:2000 requirements. The Contractor shall utilize the MSFC Audited Vendor List (AVL).

1) All subcontracts let for quality sensitive products shall utilize the MSFC supplier listings as identified for use in MWI 5330.1, section 6.2 and the links herein:

   AVL: Audited Vendor List
   LVL: Limited Vendor List
   PSAL: Project Specific Approved Supplier List

   AVL: https://msfcsma3.msfc.nasa.gov/dbwebs/apps/lvl/default_avl.asp

   LVL: https://msfcsma3.msfc.nasa.gov/dbwebs/apps/lvl/default.asp

   PSASL: https://msfcsma3.msfc.nasa.gov/dbwebs/apps/lvl/default_psasl.asp

2) All non-quality sensitive products subcontracted proposed suppliers that are not on the above referenced supplier lists (AVL, LVL, PSAL) shall be specified by the NASA product requester and evaluated for their ability to meet purchase requirements by the Contractor based on the information provided by the requester on the supplier. Supplier use for these products shall be limited to articles and materials purchased for the specific work request. If the Contractor feels that the submitted supplier cannot meet the requirements of the purchase order, coordination for resolution shall be requested through the designated project level COTR representative.

MSFC is transitioning to automated fabrication of surface mount assemblies. The Contractor shall provide a skill mix that includes both hand assembly and machine assembly experience to meet the technical requirements of this WBS.

All Contractor employees shall obtain certification to the requirements of NASA-STD-8739.

2.6 Reserved.

2.7 Space Environmental Effects Testing.

2.7.1 Contamination Control Support -The Contractor shall provide contamination control support for various programs to include review of program requirements, plans for implementation of those requirements, review of production processes and facilities, and participate in program audits as required. Processes that will require review include cleaning, cleanliness inspection, and contamination sampling. The Contractor shall operate laboratory instrumentation such as Fourier Transform Infrared (FTIR) spectrometers, contamination application systems, and vacuum test chambers for materials outgassing tests. A general knowledge of general laboratory protocol, basic spectroscopic techniques, materials analysis /characterization instrumentation operation, chemical solution mixing, sample preparation (cleaning, grit blast, contamination application, etc) and handling procedures is required. The Contractor shall interpret the results of testing, and provide written reports at the completion of each test. The Contractor shall attend meetings, present results and interact at the Program/Project level.

2.7.2 Space Environmental Effects Testing - The Contractor shall perform literature research and testing for materials exposed to space environments in order to accurately simulate a mission specific space environment within the laboratory, subject a material or system to that environment, and measure performance metrics after space environment exposure. The Contractor shall perform thorough literature research for past data and history on Space Environments Effects (SEE) including all data developed during Apollo, Skylab, other NASA missions, and missions of other agencies and countries whose data is available for public review. The Contractor shall also design, configure, modify, operate, and maintain the multiple and varied SEE test systems utilized for atomic oxygen (AO), ultraviolet (UV) radiation, charged particle radiation, plasma, and contamination including combined environments exposure testing. The Contractor shall also support Impact Test Facility operations including hypervelocity, ballistic, and environmental gun capabilities. The testing and operation includes performing the necessary calculations for accurate SEE irradiations, aid in the design and assembly of data acquisition systems, pre-test and post-test materials analyses, and impact assessments. The Contractor shall perform limited fabrication and assembly of test hardware, operate associated materials analysis/characterization instrumentation, interpret the results of testing, and provide written reports at the completion of each test. The Contractor shall attend

meetings, present results and interact at the Program/Project level. Special training is required for radiation source, propellant and explosives handling as well as test system operation.

2.7.3 Electrostatic Levitator (ESL) System Operations - The Contractor shall provide ESL support to configure, modify, operate, and maintain the test systems and associated support equipment including vacuum hardware, operating control systems, data acquisition systems, and multiple class lasers. The Contractor shall prepare samples and operate laboratory instrumentation such as optical pyrometers and spectrometers. The Contractor shall interpret the results of testing, and provide written reports at the completion of each test. The Contractor shall attend meetings, present results and interact at the Program/Project level.

2.7.4 Development of Internal, Scientific and Data Documentation and Publications - The Contractor shall create scientific, technical and data documents, and internal documentation and publications as needed and as directed by the COTR. The documents required include research papers to be published by scientific organizations, periodical sections, newspaper articles, failure analyses, problem assessments, problem resolutions, anomaly investigations, preferred materials applications documents, data explanation documents, technical evaluation documentation, and other similar scientific and engineering documentation. The Contractor shall also create needed internal documentation, which include Organizational Instructions, safety documents and communications documentation. The Contractor shall work with the MSFC printing office to ensure that all documents are in the proper format, printed properly and delivered when required. The Contractor shall also be responsible for supporting the distribution effort of all documents created under this task.

2.8 Reserved.

2.9 Environmental Gas Laboratory Support. MSFC has the requirement to verify the cleanliness of a variety of hardware and facilities that prevents the contamination of space flight hardware. These facilities and equipment include clean rooms at all cleanliness levels, flow benches, small hardware and equipment, and large hardware and cross-country cryogenic liquid and gas lines.

The cleanliness verifications are requested in two ways; (1) MSFC customer organizations request regularly scheduled verification checks, or (2) MSFC customers who do not need regular verifications request special one-time verifications performed within a specified time period. All data analyses and findings for the week are compiled into one Excel spreadsheet and sent to all customers for whom evaluations were performed.

The Contractor shall evaluate, as directed by the COTR, MSFC clean rooms, MSFC propellant lines and their components, and propellant storage vessels and their components to determine contamination or cleanliness levels. The Contractor shall follow a scheduled sampling routine to check the clean rooms and propellant systems at MSFC to determine contamination levels. The Contractor shall also perform any analysis not included on the routine checklist, if requested by the COTR. The Contractor shall develop and implement an effective electronic Special Test Order (STO) system, formerly called an Avoid Verbal Orders (AVO) system. This system will serve to request special or one-time only evaluations of clean rooms or lines. The Contractor shall track all data and evaluations from a central location, and provide a written report of all findings weekly. The Contractor shall inform the COTR

immediately if any test result is out of the tolerance levels established by MSFC or by the COTR.

2.10 Computer-Aided Design (CAD) Drawing. The Contractor shall provide design, drafting, and library support services in order to prepare, maintain, reproduce and store detailed CAD drawings. The Contractor shall provide functional designs and design drawings utilizing state of the art Computer-Aided Design (CAD) software to numerous customers, both internal (NASA) and external (other Government Agencies and/or Industry Partners), in order to support the checkout and testing of various space flight systems and components, engine systems and components, and ground support hardware through the application of static and/or dynamic loads, fluid flow tests involving water, cryogenic liquids, heated liquids, and their associated gasses, and hot fire tests of engines or engine components. The Contractor shall prepare the CAD drawings via verbal and written inputs from a Civil Servant engineer assigned as the design lead for projects that require special equipment designs to accomplish testing. The Contractor shall also use inputs from other government and non-government customer contacts, existing design drawings, and field and/or shop measurements, as necessary to accomplish the task assigned. The Contractor shall work with customers to prepare clear, complete and accurate working plans and detail drawings from rough sketches, detailed sketches, field and/or shop measurements, or notes. The Contractor shall produce final drawings showing the dimensions of parts, materials to be used, relationships of parts, and the relationship of various parts to the whole structure or project. The Contractor shall create detailed CAD format drawings from existing pencil drawings as required to accommodate testing on existing test stands or to allow for reuse of previously designed hardware to improve delivery dates of hardware and to reduce overall project cost. Designs shall be accomplished following approved standards as specified in the Branch's OWIs and accepted industry standards, such as, AISC – Steel Construction Manual, ASME Boiler and Pressure Vessel Code inclusive of all sections, ASME B31.1, Power Piping Systems, and ASME B31.3, Process Piping Systems, as well as other MSFC and Industry Partner generated documents as required to produce special equipment needed to satisfy test requirements. The test facilities and test positions at MSFC are active and include high pressure storage and run systems including pressure vessels, vacuum systems including vacuum chambers, large thrust reaction systems, static and dynamic load application systems, and personnel work and access platforms which must be worked on and around frequently requiring trips to the various test areas located at MSFC to make measurements, take photographs, and get visual confirmation related to the scope of the assigned design task. A number of the test stands and/or positions are large, with high elevations and open grating that must be accessed during the production of detailed design drawings, during hardware fabrication efforts, and during hardware installation to ensure proper fit up and to aide installation of the fabricated hardware.

The Contractor shall produce finished drawing prints and take the completed engineering drawings to MSFC organizations in order to acquire the required signatures after their design review has been completed and any modifications to the originally delivered drawings have been evaluated and applied to the drawing package.

2.11 Data Analysis and Database Entry for Material and Processes Technical Information System (MAPTIS). The Contractor shall obtain materials information and test data from manufacturers, suppliers, MSFC testing organizations, other NASA certified testing facilities, government agencies, and private companies. The Contractor shall perform engineering analyses on these for validity and enter the verified data into the MAPTIS database.

2.12 Optics Support. The Contractor shall perform optical coating, optical fabrication and metrology at MSFC, including support of JWST testing in the X-Ray Calibration Facility. The Contractor shall maintain and operate the vacuum coating facilities and coating deposition equipment, perform inspection, precision cleaning and handling of optics and vacuum hardware, and perform optical testing. The Contractor shall also perform optical fabrication, which includes, but is not limited to, resizing glass substrates via Blanchard or curve generator grinding. The Contractor shall perform optical metrology, which includes, but is not limited to, the use of the Coordinate Measuring Machine or ZYGO interferometer.

2.13 Tool Crib Operations. The Contractor shall operate the two MSFC Tool Cribs (unassociated with the tool crib supporting shop operations). The Contractor shall be responsible for the order preparation, receipt, storage, and restocking of all tools and materials, and the proper distribution of stock items to employees. The Contractor shall keep the tool cribs fully stocked by purchasing all items necessary to do so without depleting existing stock. Tool Crib items include hand tools, calibrated tools, reusable or returnable items, hazardous chemicals, controlled items and expendable items, both for flight and non-flight use. The Contractor shall also request supplies, enter into the existing inventory system any purchase order data on items received, utilize the existing bar coding system, and generate special reports on equipment usage.

3.0 IDIQ Support

Any of the following sections that do not have specific requirements will include the requirements for the respective function specified in 2.0.

3.1 Materials Testing.

3.2 ETF/EFDTF Test Support.

3.3 Structural Test Support.

3.4 Fabrication and Assembly of R&D Space Flight and Associated Hardware.

3.5 Electrical Fabrication, Test, and Assembly.

3.6 Calibration. The Contractor shall perform timely and accurate (1) servicing, repair, and calibration of inspection, measuring, and test equipment (IM&TE) assigned for calibration by authorized users of the MSFC Calibration Facility; (2) standards maintenance and certifications; (3) calibration procedure maintenance and preparation; (4) maintain calibration data in the Marshall Calibration Management Systems (MCMS) ensuring that the data stays current; (5) instrument pick-up and delivery; (6) resolution of measurement problems associated with the effort; and (7) maintenance of a dedicated metrology workforce.

3.7 Space Environmental Effects Testing.

3.8 Reserved.

3.9 Environmental Gas Laboratory Support.

3.10 Computer-Aided Design (CAD) Drawing.

3.11 Data Analysis and Database Entry for Material and Processes Technical Information System (MAPTIS).

3.12 Optics Support.

3.13 Tool Crib Operations.

3.14 Engineering Technician Support. The Contractor shall provide engineering technician services. This includes technician support needed to design, develop, analyze, and sustain space transportation systems, payloads, and spacecraft. This also includes technical support for mission operations, research investigations, and technology development initiatives.

3.15 Trade Service Support. The Contractor shall provide trade services. This includes technical support needed to design, develop, analyze, and sustain space transportation systems, payloads, and spacecraft. This also includes technical support for mission operations, research investigations, and technology development initiatives.

3.16 Valve and Component Servicing. The Contractor shall provide support for operating the center's Valve and Component Shop (V&CS). The work shall involve servicing components from fluid systems throughout the center. This includes components used for hazardous fluids such as oxygen and hydrogen. Typically, components are removed from systems by others and delivered to the V&CS for servicing. Servicing involves disassembling the component, having the component parts properly cleaned by the Government, replacing the damaged parts and soft goods, reassembling the component, pressure testing for structural integrity and leaks, and packaging for pickup by the customer. Components range from small instrumentation hand valves to very large high pressure components weighing as much as several tons. In many cases, soft goods must be fabricated from properly tested raw material to ensure compatibility with hazardous fluids. Along with the work of disassembling, cleaning, repairing, assembling, and testing components, the Contractor will be required to manage a parts room to ensure parts necessary to routinely service all anticipated components are readily available.

3.17 Space Systems Integrated Test Facility Support. The Contractor shall provide support for operating the center's Space Systems Integrated Test Facility. System tests encompass those activities required for the development, qualification, and acceptance testing of components, subsystems, and integrated space systems. Such activities include: prototype hardware/software development and test; ground support equipment development, checkout, and operation; test fixture design, fabrication, and assembly; flight hardware assembly and integration; preparation and development of test plans and procedures; functional, performance, and environmental test and checkout operations; test data analysis; test reporting; test discrepancy resolution; post shipment test and integration support; and flight operations and post mission support.

3.18 Propulsion Test Support. The Contractor shall provide support for Propulsion Testing. Marshall has numerous facilities capable of all types of rocket space transportation testing. Propulsion Test encompasses those activities required for the development, qualification, and acceptance testing of components to full-up engine systems. Test data is developed to evaluate aerospace technologies and hardware. This involves, but not limited to, facility buildup and modification, facility drawing maintenance and updates, test preparation, test operation, facility and equipment maintenance, instrumentation installation and checkout, test support fabrication and set-up, data acquisition, equipment calibration, video monitoring, test article handling, and the installation and use of high-pressure and cryogenic systems.

3.19 Support Functions. The Contractor shall provide support services to execute the PWS. This includes technical support needed to design, develop, analyze, and sustain space

transportation systems, payloads, and spacecraft. This also includes technical support for mission operations, research investigations, and technology development initiatives.

3.19.1 Chemical Analysis - The Contractor shall perform sample collection, analysis, and reporting. The Contractor shall monitor, by chemical analyses, all chemical tanks and rinse tanks in buildings 4760 and 4705 used in various plating, degreasing, etching, cleaning, and dye processes. These tanks shall be strictly monitored to ensure that chemical parameters adhere to the requirements.

3.19.2 Quality Systems Management - The Contractor shall perform quality functions to accomplish customer requirements.

3.19.3 Planning and Control - The Contractor shall perform manufacturing and test planning, including scheduling, to accomplish customer requirements.

3.19.5 Contamination Control - The Contractor shall provide support which includes, but is not limited to, requirements definition, requirements implementation, process controls, facilities controls, and testing techniques related to materials, processes and facilities. The Contractors shall provide support for a wide range of disciplines, from the ground processing of propulsion elements to the simulated on-orbit spacecraft exposure environments. Specific applications also include monitoring techniques, cleaning processes, cleanliness verification and foreign object debris program assessment.

3.19.8 Engineering - The Contractor shall provide engineering expertise necessary to support PWS area when requested.

3.19.9 Other Support Functions - There may be future requirements for support services that are not identified or implied in the PWS. If future additional support services are required, these requirements will be identified via Task Order. The Contractor shall perform and complete all technical requirements that meet the intent of the PWS and shall be provided adequate resources requested through this WBS.

Glossary

Acceptance: The activity performed on all production articles generally consisting of inspections, measurements, and tests that demonstrate that each article was manufactured as designed and with acceptable quality and workmanship, performs in accordance with specified requirements, and is acceptable for delivery.

Acceptance Review: The Acceptance Review examines the equipment, documentation, and date that support verification. An acceptance review is accomplished to assure that equipment (at any level of assembly) is ready for transfer of ownership or custody or is ready for integration into a next-higher assembly.

Acquisition: The acquiring, by contract, of supplies or services through purchase or lease, whether the supplies or services are already in existence or must be created, developed, demonstrated, or evaluated. Acquisition begins at the point when the Agency needs are established and includes the description of requirements to satisfy the Agency needs, solicitation and selection of sources, awards on contracts, contract financing, performance, administration, technical and management functions directly related to the process of fulfilling Agency needs by contract.

Adiabatic Compression Test (Pneumatic Impact Test): A test used to determine the propensity of a material to ignite when subjected to rapid confined pressurization which does not allow the dissipation of heat. The Marshall Space Flight Center (MSFC) Adiabatic Compression Tester uses oxygen gas to rapidly pressurize a small sample of material, which is then used to determine if the heat generated by the pressurization is sufficient to ignite the material.

Aerothermal Environment: Aerothermodynamic heat transfer associated with radiation or convection induced by supersonic flight or rocket plume flow fields.

Annual Operating Agreement: A NASA Center management plan which defines customer requirements, processes, and resources required to meet customer requirements, and the metrics defining effectiveness and efficiency of project processes.

Atomic Oxygen: Atomic Oxygen is formed by solar ultraviolet (UV) radiation dissociating oxygen molecules into free oxygen atoms in the outer ionosphere from altitudes greater than 100 km. Atomic oxygen reacts with many materials, eroding organic materials and oxidizing metals.

Autogenous Ignition Temperature Test is used to determine the temperature at which liquids and solids will spontaneously ignite. The material must ignite without the application of spark or flame in a high pressure oxygen enriched environment.

CAD Drawing: Computer Aided Design of systems and components typically using Microstation for 2-D designs, Solid Edge for 3-D designs, and other software packages as required by the customer.

Component End Item (CEI): Defined as the sub-assemblies and/or components data for measuring contractor's cost and schedule performance on a NASA Acquisition Contract.

Certification of Qualification (COQ): Provides a uniform method for design qualification and certification of US components and subsystems.

Clean Room: An environmentally controlled area in which temperature, humidity, particulate, molecular species, process and personnel controls are implemented to insure hardware exposure environments result in an acceptable level of cleanliness.

Commercial-Off-The-Shelf (COTS): Commercially available products that can be purchased and integrated with little or no customization.

Component: An aggregate of hardware and/or software that can be characterized by one specification, is designed by a single activity to be functionally tested, and is verified as a unit.

Contamination Control: Responsibilities encompassing materials and contamination control during all phases of hardware development including design, manufacturing, assembly, test, transportation, launch site processing, on-orbit exposure, return and refurbishment if required. Control also includes reducing the risk of hardware/system failure due to molecular or particulate contamination. Contamination is a concern in a wide range of areas including critical bondlines, reactive fluids (e.g. liquid oxygen) compatibility, and sensitive optics. Contamination control also addresses applications of a variety of facilities and instrumentation capable of contaminant detection, identification, and monitoring. Material applications dealing with environments, including production facilities, clean rooms, and on-orbit exposure area also included. Contamination control personnel advise on contamination and foreign object debris control programs as well as clean room operations by compliance with imposed standards.

Cost Performance Report: This report consists of five formats containing data for measuring contractor's cost and schedule performance on a NASA Acquisition Contract.

Critical Design Review (CDR): The CDR discloses the complete system design in full detail, ascertains that technical problems and design anomalies have been resolved, and ensures that the design maturity justifies the decision to initiate fabrication/manufacturing, integration, and verification of mission hardware and software.

Critical Processes (Quality Assurance): Are processes where uniform high quality cannot be ensured by inspection alone.

Critical Processes (Manufacturing Processes): An operation, treatment, or procedure used as a step in manufacturing, testing, or inspection that, if improperly or inadequately performed, can have a significant performance, including safety, or schedule impact on new or unique processes, hardware designed for fracture control or processes identified on the Critical Items List (CIL) or as safety hazard control items.

Demonstration Test Articles: Test articles that are used to demonstrate a manufacturing and/or assembly process or technique.

Design: The approach that engineering disciplines use to specify how to create or do something. A successful design must satisfy a functional specification, conform to the limitation s of the target medium, meets implicit or explicit requirements on performance and resource usage.

Design Definition Document: Provides a detailed description of the US at the end of a design analysis cycle.

Design for Manufacturability: The process of proactively designing products to (1) optimize all the manufacturing functions: fabrication, assembly, test, procurement, shipping, delivery, service, and repair, and (2) assure the best cost, quality, reliability, regulatory compliance, safety, time-to-market, and customer satisfaction.

Dynamic Test: Structural dynamics test technologies and facility capabilities are planned, developed, and applied to the requirements of structural analysis, flight criteria, and institutional objectives. Primary emphasis is on: certification testing to simulated flight levels; development tests to determine structural performance characteristics; experimental tests to derive structural dynamic properties, expand test technologies, and support related technology development; and experimental tests to evaluate control system technologies and concepts to mitigate structural, thermal, and control system interactions for large space structures. Test control and response data processing includes time, frequency, and spatial domain analysis formatted for compatibility with analytical models, certification criteria, and experimental objectives. A wide range of skills provide the customer with a rapid response for structural dynamics testing needs. Test engineers provide overall management and coordination of test activities. These engineering services span a wide variety of dynamics testing: modal survey, vibration, acoustics, control dynamics, and pyrotechnic shock. Force inputs are provided through electromagnetic shakers, instrumented hammers, pyrotechnic charge devices, and forced air horn loaded drivers. Measured responses are obtained through piezoelectric accelerometers, high-speed video, dynamic strain gauges, electronic speckle pattern interferometry, and non-contact laser vibrometry. Test data are provided to support correlation of the experimental results with the analytical structural models and to qualify and certify flight hardware.

Environmental Testing: Usage of thermal vacuum, thermal humidity, and thermal altitude chambers to simulate conditions related to ascent, descent, and on-orbit environments as well as conditions related to shipping and ground storage environments.

Equipment: A generic term used to refer to hardware at any level-of-assembly from a component up through an integrated system.

Evaluation Factors: Factors by which a contractor's proposal will be evaluated to make a contract award.

Export Control: United States export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), and the Export Administration Regulations (EAR.)

Export Licenses: Licenses or other approvals from the Department of State or the Department of Commerce related to export of hardware, technical data, or software, or provides technical assistance to a foreign destination or “foreign person.”

Flammability Test: A test method used to analyze the ignition potential of aerospace materials and small components, and to determine their burning characteristics. The MSFC Flammability test system is used to determine the ability of materials to resist ignition or to self-extinguish without transferring burning debris to adjacent materials.

Fluid Dynamics: Fluid mechanics or fluid dynamics is the study of the physical behavior of fluids. Fluids used at the cold flow facilities are liquids and gases - normally water and air. Testing of a fluid dynamic problem typically involves experimentally measuring various properties of the fluid, such as velocity, pressure, density, and temperature, as functions of space and time. The discipline has a number of sub disciplines, including aerodynamics (the

study of gases) and hydrodynamics (the study of liquids). Fluid mechanics has a wide range of applications engineering and aerospace. For example, it is used to determine forces and moments on spacecraft, the mass flow of fluid through turbopumps, and prediction of aerodynamic environment in turbines.

Full Time Equivalent (FTE): A FTE for civil service personnel working for NASA.

Government Furnished Equipment: Equipment used during the project lifecycle that is not property of the contractor (machine tools, test equipment, furniture, vehicles, and accessory and auxiliary items).

Government Furnished Property: Property in possession of the Government and subsequently made available to the contractor (facilities, materials, special tooling and special test equipment).

Guidance Document: A document that the Contractor will use as guidance in developing a Data Requirements Document (DRD) or a subsystem.

Inputs: A contractor provides “inputs” to a NASA document or study to allow NASA to produce a final product that may integrate the contractor’s submission with submissions from various other sources. The format for inputs is defined in a contractual Data Requirements Document.

Levitation (Electrostatic): Charged specimens are maintained floating in the desired position between electrodes. Specimens are free from contact with any equipment or container. (Reference website: http://esl.msfc.nasa.gov/)

Materials and Processes Technical Information System (MAPTIS): MAPTIS is a NASA-wide materials database established for the purpose of recording and disseminating information about materials to help assure safe material selections for NASA produced space flight hardware.

Mechanical Impact Test: A test used to determine the propensity of a material to ignite when subjected to an impact by a free-falling weight. The MSFC Ambient and High-Pressure Mechanical Impact testers use a plummet to impact a disk of the sample material which is immersed in liquid or gaseous oxygen.

Metrology: Calibrated measurement or characterization of the fine dimensions, shape or surface roughness of precision manufactured hardware or optical components (lenses, mirrors and other specialized optics). Typically, government furnished equipment is provided for such tasks.

Material Usage Agreement (MUA): An agreement between the contractor and the government encompassing all agreed upon materials for use in the launch vehicle or spacecraft.

National Center for Advanced Manufacturing (NCAM): Located within Materials and Processes Laboratory, NCAM addresses the manufacturing requirements of space transportation systems. Through NCAM, partnerships between National Aeronautics and Space Administration (NASA), other government agencies, industry, and academia are formed that leverage assets and successfully meet the requirements of future aerospace systems-- systems that will ultimately provide safe and low-cost access to space.

Organizational Issuances (OI): Documents that provide procedures, instructions, etc., for internal use within an organization. OI's include Organizational Work Instructions (OWI's), procedures, plans, etc.

Organizational Work Instructions (OWI): Documents that provide detailed instructions stating how to perform specific Marshall Management System directed duties that apply to one or more Marshall Space Flight Center organizations, but not all. The OWI document type can be used when other document type designations do not apply.

Oxygen Index Test: A test used to determine the minimum oxygen concentration in a mixture of oxygen and nitrogen that will support flaming combustion of a material initially at room temperature.

Past Performance: Factual information about the performance of a contractor against the performance requirements in past contracts.

Performance Assessment Plan: Describes the Contractor's overall approach to contract performance assessment and the implementation process for accomplishing metric evaluation and reporting.

Performance Management Review: Integrated review of cost, schedule, and technical performance on the contract.

Plasma: A quasi-neutral gas of charged and neutral particles which exhibit collective behavior.

Promoted Ignition-Combustion Test: Promoted Ignition-Combustion Test is a test used to determine the flammability of materials, mainly metals, in 50 to 10,000 psi gaseous oxygen (GOX), through the utilization of a promoter material that adds supplemental heat in order to initiate combustion. The MSFC Promoted Ignition-Combustion tester uses a metal promoter to initiate the combustion of a rod of the sample material.

Prototype: An original engineering unit/model utilized early in the design process to resolve design issues.

Real-Time Support: Level of support that has the personnel, tools, and location necessary for a timely response.

Risk: The uncertainty of attaining a performance outcome or result and is the function of the probability and the consequence of failing to attain the performance outcome or result.

Risk Management: The processes for identifying, assessing, mitigating, and tracking risks.

Safety: Freedom from those conditions that can cause death, injury, occupational illness, damage or loss of equipment or property, or damage to the environment.

Space Act Agreement (SAA): Specifically, SAAs are those "agreements whose authority is derived from NASA`s "other transaction" authority of the NASA Space Act [of 1958]. It does not include Chiles Act (also known as the Federal Grant and Cooperative Agreement Act) cooperative agreements [31 U.S.C. § 6305] or grants [31 U.S.C. § 6304]. …these "other transaction" agreements (referred to as SSA) also do not include procurement contracts. Therefore, procurement laws and regulations are not applicable." {""Agreement" defined in the

broadest of contexts includes any agreement concluded under the authority of the NASA Space Act [of 1958] (contracts, leases, cooperative agreements, or other transactions). Generally, agreements establish a set of legally enforceable promises between NASA and another party to the agreement, requiring a commitment of NASA resources (including funding, services, equipment, expertise, information, or facilities to accomplish the objectives of the agreement."}

Space Environmental Effects (SEE): SEE provides valuable information to designers, engineers, and scientists on the behavior of materials in the space environment. Test facilities are utilized to evaluate materials optical, mechanical, and electrical property performance in atomic oxygen, ultraviolet radiation, charged particles, plasma, and thermal vacuum environments. Flight experiments such as those on the Long Duration Exposure Facility, the Passive Optical Sample Assembly, and the Optical Properties Monitor are also used for materials evaluation. The synergistic effects of these aspects of the space environment are still not completely understood and continue to be investigated. The data from these specialized test systems, combined with analytical results from material flight experiments, enable one to determine optimum materials for use on spacecraft.

Statement of Work (SOW): A document that expresses the tasks to be performed by the Contractor.

Structural Test: Structural strength testing is a simulation of a product's actual service life loads on a test article, the measurement and evaluation of the test article's response parameters, and the correlation of test data with analytical models. It involves imposing and controlling discrete loads, temperatures, and pressures to affect the interactive behavior of test articles to simulate actual service life conditions. Forcing functions are derived with hydraulic actuators, heating and/or cooling systems or fluids, and pressurization systems. Response characteristics are measured in terms of strain, temperature, and displacement. Measured data is processed to determine test article reactions to applied loads, to verify design concepts, and to correlate analytical models. Structural test systems can integrate audio, video, still photography, nondestructive evaluation techniques, and user-supplied measurement types into the overall test system.

A wide range of skills provide the customer with a rapid response for structural testing needs. Test engineers provide overall management and coordination of test activities. Instrumentation and load control engineers support test engineers in accomplishing all test requirements to ensure that all measurement and force loading profiles are properly addressed and performed. Mechanical technicians perform set-ups of mechanical reaction fixtures, hydraulic load application equipment, and test articles. Electrical technicians install and functionally verify (mechanically and electrically) test article instrumentation, strain gauges (including cryogenic applications), and other devices/sensors to measure displacements, loads, pressures, temperatures, etc.

Test Support: The diverse skills of the Environmental Test Facility (ETF) personnel can provide the customer with quick turnaround in test setup. Crafts include certified leak-check operators, certified welders, electricians, and machine shop operators. The ETF staff can develop the tooling and fixtures needed for tests such as cold plates and installation of special chamber feedthroughs.

Thermal Altitude Testing: Usage of test chambers to subject test articles to temperatures ranging from -70 degrees C to 190 degrees C and altitudes ranging from sea level to 100,000 feet.

Thermal Humidity Testing: Usage of test chambers to subject test articles to temperatures ranging from -70 degrees C to 190 degrees C and humidity ranging from 5% to 95%.

Thermal Vacuum Stability (Outgassing) Test: A test method used to evaluate the mass loss of materials being subjected to 125°C at a pressure less than 5 x 10^{-}5 psi for 24 hours. The test primarily is used to determine the tendency of a non-metallic material to release volatile compounds.

Thermal Vacuum Testing: Usage of test chambers to subject test articles to temperatures ranging from -170 degrees C to 200 degrees C and pressures ranging from ambient to 5 x 10^{-8} torr.

Toxic Offgassing (Toxicity) Test: A test method used to determine the identity and quantity of volatile compounds which are given off from materials and flight hardware. The compounds are then evaluated for their potential impact on human health. The MSFC Toxicity test is conducted at 120°F in order to allow the test material to give off the maximum amount of volatile compounds.

Vacuum Bakeout Facilities: Thermal vacuum bakeouts are preformed in the Sunspot, V4, V5, V6, V8, V9 and V11 Chambers. Vacuum bakeout cleans components before flights and prior to testing for certification to optical cleanliness specifications MSFC Specification 1238. Instrumentation includes thermocouples and ionization and convection pressure gauges.

Validation: Assessment of a set of requirements demonstrating that the requirements are feasible within allowable means (cost/schedule/technical capability), are verifiable, and if fully met, will produce a product that accomplishes the intended objectives. Proof that the product accomplishes the intended purpose. May be determined by a combination of test, analysis, and demonstration

Verification: Proof of compliance with specifications. May be determined by a combination of test, analysis, demonstration, and inspection.

Work Breakdown Structure: A product-oriented hierarchical division of the hardware, software, services, and data required to produce the program's/projects end product, structured according to the way the work will be performed, and reflective of the way in which program/project costs, schedule, technical and risk data are to be accumulated, summarized and reported.

Work Year Equivalent (WYE): Work year equivalent for contractors performing work on NASA contracts.

DATA NO.	PROCUREMENT DOC. ISSUE
1163	**BASIC**

NNM08AA20C
CONTRACT/RFP

EXHIBIT NUMBER

J-2
ATTACHMENT NUMBER

Marshall Engineering Technician and Trade Services (METTS)
PROJECT/SYSTEM

DATA PROCUREMENT DOCUMENT

TBD
CONTRACTOR

January 02, 2008
DATE

National Aeronautics and
Space Administration

MSFC - Form 3461 (Rev September 1989)

National Aeronautics and Space Administration ***DOCUMENT CHANGE LOG***					DATA PROCUREMENT DOC. NO. ISSUE **1163 RFP**	
INCORPORATED REVISIONS OUTSTANDING REVISIONS				AS OF: 07-12-07	SUPERSEDING:	PAGE:
AUTHORITY	PORTION AFFECTED - PAGE NO./NO.				REMARKS	
	INTRO	SGR	DRL	DRD		

MSFC - Form 3461-1 (Rev August 1970)

National Aeronautics and Space Administration **PAGE REVISION LOG**		DATA PROCUREMENT DOC. NO. ISSUE **1163** **RFP**	
NOTE: The current revision is denoted by a vertical line in the outer margin adjacent to the affected text.	AS OF: 07-12-07	SUPERSEDING:	PAGE:

INSERT LATEST REVISED PAGES. DISCARD SUPERSEDED PAGES.

ITEM	PAGE	STATUS	ITEM	PAGE	STATUS

MSFC - Form 3461-2 (Rev August 1970)

1.0 INTRODUCTION

1.1 Scope: Subject to the Rights in Data clause, this Data Procurement Document (DPD) sets forth the data requirements in each Data Requirements Description (DRD) and shall govern that data required by the DPD for the contract. The contractor shall furnish data defined by the DRD's listed on the Data Requirements List (DRL) by category of data, attached hereto, and made a part of this DPD. Such data shall be prepared, maintained, and delivered to NASA in accordance with the requirements set forth within this DPD. In cases where data requirements are covered by a Federal Acquisition Regulation (FAR) or NASA FAR Supplement (NFS) clause, that clause shall take precedence over the DPD, consistent with clause FAR 52.215-8.

1.2 DPD Description: This DPD consists of a Document Change Log, a Page Revision Log, a Table of Contents, an Introduction, a Statement of General Requirements, DPD maintenance procedures, a DRL, and the DRD's.

1.2.1 General Requirements: The general requirements, as specified in paragraph 2.0 of this DPD, prescribe those requirements applicable to the preparation, maintenance, and delivery of data that are better defined in aggregate than in the individual DRD's.

1.2.2 Data Requirements List (DRL): Throughout the performance of the contract, the DRL provides a listing by data category of the data requirements of the DPD.

1.2.3 Data Requirements Descriptions (DRD's)

1.2.3.1 Each data requirement listed on the DRL is given complete definition by a DRD. The DRD prescribes content, format, maintenance instructions, and submittal requirements.

1.2.3.2 For the purpose of classification and control, DRD's of this DPD are grouped into the following broad functional data categories:

CATEGORY SYMBOL	DESCRIPTION
CD	Contractual Data
CM	Configuration Management
LS	Logistics/Support
MA	Management
QE	Quality
SA	Safety

1.2.3.3 The symbols representing these data categories form part of the prefix of the DRD identification number. The first numerical characters reflect the DPD number.

1.2.3.4 To facilitate the usage and maintenance of the DPD, the DRD's have been sectionalized in accordance with the above data categories.

1.2.3.5 The DRD's are filed by data category and are in alpha-numeric sequence as listed on the DRL page (or pages) that precedes the DRD's.

1.2.4 Document Change Log (DCL) and Page Revision Log (PRL): The Document Change Log chronologically records all revision actions that pertain to the DPD. The Page Revision Log describes the current revision status of each page of the DPD and thus, at all times, provides its exact configuration.

1.2.5 DPD Maintenance Procedures: Maintenance procedures define the detailed methods to be employed in maintaining the DPD. Detailed maintenance procedures are specified in paragraph 3.0 of this DPD.

1.3 Data Types for Contractual Efforts: The types of data and their contractually applicable requirements for approval and delivery are:

TYPE	DESCRIPTION
1*	All issues and interim changes to those issues require written approval from the requiring organization before formal release for use or implementation.
2*	NASA reserves a time-limited right to disapprove in writing any issues and interim changes to those issues. The contractor shall submit the required data to NASA for review not less than 45 calendar days** prior to its release for use. The contractor shall clearly identify the release target date in the "submitted for review" transmittal***. If the data is unacceptable, NASA will notify the contractor within 45 calendar days** from the date of submission, regardless of the intended release date***. The contractor shall resubmit the information for reevaluation if disapproved. The submittal is considered approved if the contractor does not receive disapproval or an extension request from NASA within 45 calendar days**.
3	These data shall be delivered by the contractor as required by the contract and do not require NASA approval. However, to be a satisfactory delivery, the data shall satisfy all applicable contractual requirements and be submitted on time.
4	These data are produced or used during performance of the contract and are retained by the contractor. They shall be delivered only when NASA requests in writing and shall be delivered in accordance with the instructions in the request. The contractor shall maintain a list of these data and shall furnish copies of the list to NASA when requested to do so.
5	These data are incidental to contract performance and are retained by the contractor in those cases where contracting parties have agreed that formal delivery is not required. However, the Contracting Officer or the Contracting Officer's Representative shall have access to and can inspect this data at its location in the contractor's or subcontractor's facilities, or in an electronic database accessible to the Government.

* Note: Type 1 and Type 2 data may be placed under NASA configuration management control when designated by NASA. CM control requires the contractor to submit Type 1 and Type 2 data updates through Engineering Change Proposals (ECPs).

** Note: This time limit may be tailored for individual DPD's to meet the requirements of the procuring activity.

*** Note: If the contractor does not identify a release target date or if the intended release date is shorter than 45 calendar days from the date of submission, the 45 calendar days review cycle stands (or the tailored Type 2 time limitation for the specific procurement).

2.0 STATEMENT OF GENERAL REQUIREMENTS

2.1 Applicable/Reference Documents: Documents included as applicable documents in this DPD are the issue specified in the Performance Work Statement (PWS), and form a part of the DPD to the extent specified herein. Applicable documents listed in Item 15.2 of a DRD are applicable only to the preparation of the deliverable documentation described by that DRD.

References to documents other than applicable documents in the data requirements of this DPD may sometimes be utilized, and shall be indicated in 13. Remarks of the DRD. These do not constitute a contractual obligation on the contractor. They are to be used only as a possible example or to provide related information to assist the contractor in developing a response to that particular data requirement.

2.2 Subcontractor Data Requirements

2.2.1 The contractor shall specify to subcontractors and vendors, if any, the availability source of all data required for the satisfactory accomplishment of their contracts. The contractor shall validate these requirements for documents when appropriate; where the requirement concerns other contractor data, the contractor shall provide his subcontractor or vendor with the necessary documents. All such requests shall be accomplished under the auspices of the contractor.

2.2.2 Reference to subcontractor data in the contractor's responses is permissible, providing the references are adequate and include such identification elements as title, number, revision, etc., and a copy of the referenced data is supplied with the response document at time of delivery to NASA.

2.3 Data Distribution, Format, Data Restriction Marking, and Transmittal

2.3.1 Distribution: Distribution of required documentation shall be in quantities determined by the Contracting Officer. Recipient names and email (if applicable) addresses shall be noted on a separate distribution list to be furnished by the Contracting Officer. The Contracting Officer's letter may include other information pertinent to delivery of data, as required.

2.3.2 Format

2.3.2.1 Electronic Format: Electronic submission of data deliverables is required. Electronic deliverables shall be printable. Data deliverables shall be delivered to NASA in the format specified below unless a specific format is required by a DRD. Data submittals shall consist of a single Adobe Acrobat PDF file and the native format electronic file(s). The preferred native formats include Microsoft Word, Excel, PowerPoint or CAD drawing plot file, as appropriate. Where a single native format file is not possible, multiple files may be integrated into a single ZIP file for submission. The organization of the contents of the integrated ZIP file shall be made readily apparent to the reader, and each file within the integrated product shall be clearly identifiable and traceable within the organization of the integrated product. If files are fragmented, file names shall be labeled logically and contiguously, and the files shall be easily reassembled or merged (e.g. 1 filename, 2 filename, 2a filename, etc.). The software versions shall be confirmed prior to submittals.

2.3.2.2 Hardcopy Format: In addition to the electronic submittal, one hardcopy package of specific data deliverables shall be delivered to the NASA Contracting Officer for the Government contract file. This requirement is indicated in Item 15.4, Format of each DRD. The hardcopy package shall consist of the contractor's Transmittal Memo and one copy of the data deliverable.

2.3.3 Data Restriction Marking

2.3.3.1 Data Restriction Determination and Marking Requirements: The contractor shall determine the data restriction that applies to each data deliverable and mark the data restriction on the data coversheet, or indicate the data restriction in the data transmittal package if the data format precludes identification of data restriction directly in the data. The contractor shall make a

determination for each individual data deliverable item, and shall not apply a default or blanket data restriction marking to all data deliverables (e.g., "data may be export restricted"). If NASA does not agree with the contractor applied data restriction, the NASA Contracting Officer shall return the data to the contractor, cancel the markings, or ignore the markings consistent with the procedures set forth in the "data rights" clause(s) contained in the contract.

2.3.3.2 Data Restriction Categories and Marking Statements: The contractor shall consider the following data restriction categories, as a minimum, and utilize specified marking statements.

If data delivered under this contract is subject to the International Traffic in Arms Regulations (ITAR), the data shall contain an "ITAR Notice" as follows:

International Traffic in Arms Regulations (ITAR) Notice

This document contains information which falls under the purview of the U.S. Munitions List (USML), as defined in the International Traffic in Arms Regulations (ITAR), 22 CFR 120-130, and is export controlled. It shall not be transferred to foreign nationals in the U.S. or abroad, without specific approval of a knowledgeable NASA

If data delivered under this contract is subject to the Export Administration Regulations (EAR), the data shall contain the "EAR Notice" as follows:

Export Administration Regulations (EAR) Notice

This document contains information within the purview of the Export Administration Regulations (EAR), 15 CFR 730-774, and is export controlled. It may not be transferred to foreign nationals in the U.S. or abroad without specific approval of a knowledgeable NASA export control official, and/or unless an export license/license exception is obtained/available from the Bureau of Industry and Security, United States Department of Commerce. Violations of these regulations are punishable by fine, imprisonment, or both.

If the contract contains FAR 52.227-14 *Alternate II*, the "Limited Rights Notice" may be applicable to data (other than computer software) delivered under this contract.

If the contract contains FAR 52.227-14 *Alternate III*, the "Restricted Rights Notice" may be applicable to computer software delivered under this contract.

If the contract contains FAR 52.227-20, the "SBIR Rights Notice" may be applicable to SBIR data delivered under this contract.

If the contract contains NFS 1852.237-73, a sensitive information legend may be applicable to information delivered under this contract.

In accordance with the applicable data clause (e.g., FAR 52.227-14(c) or FAR 52.227-20(c)), the contractor may be able to assert a copyright claim in data delivered under this contract. When claim to copyright is made, the Contractor shall affix the applicable copyright notices of 17 U.S.C. 401 or 402 and acknowledgment of Government sponsorship (including contract number) to the data when such data are delivered to the Government.

2.3.4 Transmittal

2.3.4.1 Data shall be transmitted to NASA by email, CD or DVD, hardcopy, or other mechanism agreed to by the Contracting Officer, COTR, and Project representatives who are responsible to receive, index, and store the data deliverables.

2.3.4.2 If email is used to transmit data deliverables, the email size shall be 10 Megabytes or less to ensure receipt by the NASA email servers. Encrypted email format shall be used to transmit data which has been judged sensitive by the contractor (e.g., export controlled, limited rights data, SBIR, restricted computer software, copyrighted, etc.).

2.3.4.3 Data Transmittal Package: Each data transmittal package shall include:

a. Transmittal memorandum that specifies the meta-data below for each data transmittal:
   1. Contract number.
   2. Data Requirements Description (DRD) number.
   3. DRD data type (specified in Item 3 on the DRD).
   4. Submission date or milestone being satisfied.
   5. Document number and revision.
   6. Document title.
   7. File names of all files being delivered; file naming convention shall clearly identify the document being delivered.
   8. Distribution (as defined by the Contracting Officer's letter).
   9. Requested response date.
   10. Contractor assigned data restriction (export controlled, limited rights data, SBIR, restricted computer software, copyrighted, etc.) if not marked on data.
   11. NASA Records Retention Schedule (NRRS) number, if applicable. (See NPR 1441.1, NASA Records Retention Schedules).
b. Printable electronic files or hardcopy data.

2.3.5 Use of the MSFC Documentation Repository: Marshall Policy Directive (MPD) 2210.1 specifies the requirements for utilizing the Documentation Repository. Electronic data deliverables should be transmitted directly to the Repository via a secure web page, available at https://webpub.nis.nasa.gov/submittal/index.html. Computer-Aided Design (CAD) drawings shall be submitted in the original native vector, Hewlett-Packard Graphic Language (HPGL) and raster image formats.

2.4 Printing: All printing, duplicating, or binding shall be in accordance with NFS 1852.208-81, Restrictions on Printing and Duplicating. Printing of formal reports and Type 1 and 2 data in book format shall be in accordance with the following general specifications:

a. Method of reproduction – offset/xerography.
b. Finished size – 8 1/2" X 11".
c. Paper – 20-pound opaque bond.
d. Cover – Litho cover stock.
e. Pages shall be printed on both sides; blank pages shall be avoided when possible.
f. Oversize pages shall be avoided when possible, but if necessary shall be folded to 8 1/2" X 11".
g. Binding shall be the most economical method commensurate with the size of the report and its intended use.

2.5 Contractor's Internal Documents: The contractor's internal documents shall be used to meet the data requirements of this DPD unless a specific format is required by the applicable DRD.

2.6 Document Identification: Type 1 and 2 documents published by the contractor and submitted in response to the data requirements of this DPD shall be identified within an organized identification numbering system prescribed to NASA by the contractor and, if applicable, as

approved by NASA. For all data types, the document number, change legend, date, and title constitute the minimum identification of the specific document and shall appear on the cover and title page. The contract number shall also appear on the cover and title page as separate markings. The originator and organization shall be included on the title page. The document number, change legend, and date shall appear on each page of the document. In the front matter of each document, identify the DPD number and applicable DRD number(s) required for document preparation. Successive issues or revisions of documents shall be identified in the same manner as the basic issue and shall have appropriate change identification. Drawings and ECP's are excluded from the marking provisions of this paragraph. All Type 1 documentation, excluding configuration management requirements, shall be marked "PRELIMINARY PENDING NASA APPROVAL," and once approved shall be reissued with "APPROVED BY NASA" and the date and approval authority annotated on the cover.

2.7 Reference to Other Documents and Data Deliverables in Data Submittals: All referenced documents shall be made readily available to the cognizant NASA organization upon request. The contractor should make sure that the references are available to NASA in a manner which does not incur delays in the use of the response document. Reference may be made, within one data submittal, to other data submittals delivered in response to this DPD in those cases where the data required by one DRD may have been delivered by the contractor in response to another DRD. The reference to previously-submitted data shall include the applicable DRD number, data submittal version date, and location within the referenced document.

2.8 Maintenance of Type 1 Document Submittals

2.8.1 Revisions of Type 1 documentation may be accomplished either by individual page revision or by a complete reissue of the document identified in accordance with requirements of 2.7 above, with the exception of drawings (which shall be revised in accordance with contract configuration management requirements).

2.8.2 Individual page revisions shall be made as deemed necessary by the contractor or as directed by the Contracting Officer.

2.8.3 A Type 1 document shall be completely reissued when, in the opinion of the contractor and/or NASA, the document has been revised to the extent that it is unusable in its present state, or when directed by the Contracting Officer. When complete reissues are made, the entire contents of the document shall be brought up to date and shall incorporate revised pages. All revisions shall be recorded. A revision log shall identify complete reissues except for periodic reports and documents which are complete within themselves as final.

2.8.4 Changes of a minor nature to correct obvious typing errors, misspelled words, etc., shall only be made when a technical change is made, unless the accuracy of the document is affected.

2.8.5 All revised pages shall be identified by a revision symbol and a new date. Each document shall contain a log of revised pages that identify the revision status of each page with the revision symbol. This list shall follow the table of contents in each document. The line or lines revised on a given page shall be designated by the use of vertical line in the margin of the page, and the change authority shall be indicated adjacent to the change.

2.8.6 Contractor Type 1 documents shall not be submitted containing pen and ink markups which correct, add to, or change the text, unless schedule problems exist and approval is obtained in writing from the Contracting Officer. Such markups, however, shall not exceed 20 percent of the page content and shall be acceptable provided that the reproduced copies are legible. In addition, hand-drawn schematics, block diagrams, data curves, and similar charts may be used in original

reports in lieu of formally prepared art work, as long as legibility of copies is not impaired. Acceptability shall be determined by the Contracting Officer.

3.0 DPD MAINTENANCE PROCEDURES

3.1 NASA-Initiated Change: New and/or revised data requirements shall be incorporated by contract modification to which the new or revised portion of the DPD shall be appended. The contractor shall notify the Contracting Officer in the event a deliverable data requirement is imposed and is not covered by a DRD, or when a DRD is changed by a contract modification and for which no revision to DPD is appended. In such cases, the contractor shall submit the requested changes to NASA for approval. See paragraph 3.3.1 for change procedures.

3.2 Contractor-Initiated Change: Contractor-proposed data requirements, or proposed changes to existing requirements shall be submitted to NASA for approval.

3.3 DPD Change Procedures

3.3.1 Changes to a contractual issue of this DPD shall be identified by NASA on the Document Change Log and Page Revision Log. The actual revised material on the DPD page shall be identified by placing a heavy vertical line in the right-hand margin extending the entire length of the change. In addition, the numerical control number of the contractual direction authorizing the change shall be placed adjacent to the vertical revision line. These revision identifiers shall be used to reflect the current revision only; any previous symbols on a page shall be deleted by the current revision.

3.3.2 The date of the contractual direction paper, e.g., Change Order, Supplemental Agreement, or Contracting Officer's letter shall be entered under the "Status " column of the Page Revision Log adjacent to the affected page or DRD number, and in the "as of" block. The date that was in the "as of" block shall be entered in the "Superseding" block.

3.3.3 The Document Change Log entitled "Incorporated Revisions" shall be changed to indicate the number, portions affected, and associated Supplemental Agreement number, if applicable.

3.3.4 The Document Change Log entitled "Outstanding Revisions" is changed periodically to indicate outstanding Change Orders and Contracting Officer notification letters.

3.4 DPD Reissues

3.4.1 When conditions warrant, the DPD shall be reissued by NASA and shall supersede the existing DPD in its entirety. Reissues shall be issued by contractual direction.

3.4.2 All revision symbols (vertical lines and contractual direction control numbers) shall be removed from all pages; revision dates shall remain in the Date Revised block on DRD's that have been revised. The issue symbol, which shall commence with "A" and progress through "Z," shall be entered in the DPD identification block of each DRD page of the DPD.

MARSHALL ENGINEERING TECHNICIAN AND TRADES SERVICES (METTS)

DATA REQUIREMENTS LISTS

DRD	DATA TYPE	TITLE	OPR
CD - Contractual Data			
1163CD-001	2	Contractor Information Technology Security Program Plan	IS10
1163CD-002	3	Technology Reports	ED03
CM - Configuration Management			
1163CM-001	1	Acceptance Data Package	ED03
1163CM-002	2/3	Functional Configuration/Physical Configuration Audit Documentation	ED03
LS -Logistics			
1163LS-00l	2	Government Property Management Plan	AS41
MA - Management			
1163MA-001	1	Management Plan	ED03
1163MA-002	1	Task Order Plan (TOP)	ED03
1163MA-003	3	Financial Management Report (533M)	CS40
1163MA-004	3	Monthly Status Report	ED03
1163MA-005	3	Badged Employee and Remote IT User Listing	AS50
1163MA-006	3	Contractor Employee Clearance Document	AS50
1163MA-007	3	Position Risk Designation for Non-NASA Employee	AS50
1163MA-008	3	Monthly and Semi-Annually Performance Reports	ED03
1163MA-009	2	Organizational Conflict of Interest (OCI) Avoidance Plan	PS21
QE - Quality			
1163QE-001	1	Quality Management System Plan	QD40
SA - Safety			
1163SA-001	2	Safety, Health and Environmental (SHE) Plan	QD50/AS10
1163SA-002	1	Personnel Certification Plan	QD40
1163SA-003	3	Mishap and Safety Statistics Report	QD50

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163CD-001**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Contractor Information Technology Security Program Plan

7. **DESCRIPTION/USE**: To ensure that the contractor fully understands their responsibility for information and information technology (IT) security as required in NFS 1852.204-76. This plan will describe the contractor's information technology security program that addresses the management, operational, and technical aspects of protecting the confidentiality, integrity and availability of information and information technology systems.

8. **OPR**: IS10 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: 30 days after Contract Award

12. **SUBMISSION FREQUENCY**: Revise after any significant changes. Review and update every three years.

13. **REMARKS**: The Federal Information Processing Standards (FIPS) Publication Series of the National Institute of Standards and Technology (NIST) is the official series of publications relating to standards and guidelines adopted and promulgated under the provisions of the Federal Information Security Management Act (FISMA) of 2002. FIPS Pub 200, Minimum Security Requirements for Federal Information and Information Systems, specifies minimum security requirements for information and information systems supporting the executive agencies of the federal government and a risk-based process for selecting the security controls necessary to satisfy the minimum security requirements.

    The seventeen security-related areas to be addressed in the content of the Contractor IT Security Program Plan represent a broad-based, balanced information technology security program that addresses the management, operational, and technical aspects of protecting information and information technology systems. Additional information for these security-related areas can be found in FIPS Pub 200.

14. **INTERRELATIONSHIP**: PWS paragraph 1.2.4

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The extent of the Contractor IT Security Program Plan can vary and shall be appropriate to comply with the breadth of sensitivity level security requirements for protecting information and information technology (IT) when the Contractor or its subcontractors must obtain physical or electronic access to NASA's computer systems, networks, or IT infrastructure, or where information is stored, generated, processed or exchanged by/with NASA or on behalf of NASA by a contractor or subcontractor, regardless of whether the information resides on a NASA or a contractor/ subcontractor's information system.

15.2 **APPLICABLE DOCUMENTS**:

NFS 1852.204-76 *Security Requirements for Unclassified Information Technology Resources (May 2007)*

DRD Continuation Sheet

TITLE: Contractor Information Technology (IT) Security Program Plan **DRD NO.**: **1163CD-001**

DATA TYPE: 2 **PAGE**: 2/2

15. **DATA PREPARATION INFORMATION**:

15.3 **CONTENTS**: The Contractor IT Security Program Plan shall contain:

a. A brief description of the types of information that will be stored, generated, processed, or exchanged with NASA or on behalf of NASA during the performance of the contract. Provide the security categorization of the information (LOW, MODERATE, or HIGH). A description of the policy or procedure to ensure the return of all NASA information and IT resources provided to the contractor during the performance of the contract and certify that all NASA information has been purged from contractor-owned systems used in the performance of the contract.

b. A brief description regarding personnel (location, local or remote connections or access, privileged users, etc.) and the IT resources (NASA provided or contractor-owned) and environments utilized in the support of the work to be performed and their access to information identified.

c. A brief description of policy or procedure that ensures the contractor inserts NFS 1852.204-76 in all subcontracts as required.

d. Provide a description of each of the security-related areas (see Remarks) with regard to policies and procedures of the contractor's enterprise-wide information technology security program protecting the confidentiality, integrity, and availability of information and information technology systems.

1. Management.
   (a) Certification, Accreditation, and Security Assessments.
   (b) Planning.
   (c) Risk Assessment.
   (d) Systems and Services Acquisition.
2. Operational.
   (a) Awareness and Training.
   (b) Configuration Management.
   (c) Contingency Planning.
   (d) Incident Response.
   (e) Maintenance.
   (f) Media Protection.
   (g) Physical and Environmental Protection.
   (h) Personnel Security.
   (i) System and Information Integrity.
3. Technical.
   (a) Access Control.
   (b) Audit and Accountability.
   (c) Identification and Authentication.
   (d) System and Communications Protection.

NOTE: Any security-related area not currently implemented in the Contractor's IT security program shall be identified and the contractor's plan of action for implementation shall be explained.

15.4 **FORMAT**: Contractor format is acceptable and shall be consistent with contents of paragraph 15.3d of this DRD.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163CD-002**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/3

6. **TITLE**: Technology Reports

7. **DESCRIPTION/USE**: Provides NASA with technical information concerning any invention, discovery, improvement, or innovation made by a contractor in the performance of work under this contract for the purpose of disseminating this information to obtain increased use. Also, to provide NASA with data to review for possible patentable items.

8. **OPR**: ED03 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**:
Disclosure of Invention and New Technology (NASA Form 1679): Within 2 months of identification of subject invention.
Interim NASA New Technology Summary Report (NTSR) Form: 12 months from the date of the contract.
Utilization Report: Upon Contracting Officer's request.

12. **SUBMISSION FREQUENCY**:
Disclosure of Invention and New Technology (NASA Form 1679): For each subject invention.
Interim NASA New Technology Summary Report (NTSR): Every 12 months.
Final NASA New Technology Summary Report (NTSR): Three months after completion of contracted work.
Utilization Report: No more frequently than annually.

13. **REMARKS**: Copies of NASA Forms 1679, and the NASA New Technology Summary Report Form (Interim and Final) may be obtained and filled out electronically at: http://www.webentre.nasa.gov/. These forms may also be obtained from the New Technology Representative (mailto: Carolyn E.McMillan@nasa.gov).
14. **INTERRELATIONSHIP**: PWS paragraph 1.2.3

15. **DATA PREPARATION INFORMATION**:
15.1 **SCOPE**: The Technology Reports include technical detail as is necessary to identify and fully describe a "Subject Invention". Per FAR 52.227-11, "Subject Invention" means any invention of the contractor conceived or first actually reduced to practice in the performance of work under this contract.

15.2 **APPLICABLE DOCUMENTS**:

FAR 52.227-11	Patent Rights - Retention by Contractor (Short Form) (June 1997) - As modified by NASA FAR Supplement 1852.227-11

DRD Continuation Sheet

TITLE: Technology Reports **DRD NO.**: **1163CD-002**

DATA TYPE: 3 **PAGE**: 2/3

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

15.3 **CONTENTS**: The Technology Reports consist of:

a. Disclosure of Invention and New Technology (Including Software): In accordance with FAR 52.227-11(c), the disclosure to the agency shall be in the form of a written report and shall identify the contract under which the invention was made and the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding to the extent known at the time of the disclosure, of the nature, purpose, operation, and the physical, chemical, biological or electrical characteristics of the invention. The disclosure shall also identify any publication, on sale or public use of the invention and whether a manuscript describing the invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to the agency, the Contractor shall promptly notify the agency of the acceptance of any manuscript describing the invention for publication or of any on sale or public use planned by the Contractor. This reporting requirement may be met by completing NASA Form 1679 (latest revision) in hardcopy or online at: http://www.webentre.nasa.gov/. Use of this form or the online system is preferred; however, if the form is not used the following information should be provided in order to meet the reporting requirement:

1. Descriptive title.
2. Innovator(s) name(s), title(s), phone number(s), and home address(es).
3. Employer when innovation made (name and division).
4. Address (place of performance).
5. Employer status (e.g., Government, college or university, non-profit organization, small business firm, large entity).
6. Origin (e.g., NASA grant number, NASA prime contract number, subcontractor, joint effort, multiple contractor contribution, other).
7. NASA Contracting Officer's Technical Representative (COTR).
8. Contractor/grantee New Technology Representative.
9. Brief abstract providing a general description of the innovation:
   (a) Description of the problem or objective that motivated the innovation's development.
   (b) Technically complete and easily understandable description of innovation developed to solve or meet the objective.
   (c) Unique or novel features of the innovation and the results or benefits of its application.
   (d) Speculation regarding potential commercial applications and points of contact (including names of companies producing or using similar products).
10. Additional documentation.
11. Degree of technological significance (e.g., modification of existing technology, substantial advancement in the art, major breakthrough).
12. State of development (e.g., concept only, design, prototype, modification, production model, used in current work).
13. Patent status.
14. Dates or approximate time period during which this innovation was developed.
15. Previous or contemplated publication or public disclosure including dates.
16. Answers to the following questions (for software only):
   (a) Using outsiders to beta-test code? If yes, done under beta-test agreement?
   (b) Modifications to this software continue by civil servant and/or contractual agreement?
   (c) Previously copyrighted (if so, by whom?)?

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

(d) Were prior versions distributed (if yes, supply NASA or Contractor contract)?

(e) Contains or is based on code owned by a non-federal entity (if yes, has a license for use been obtained?)?

(f) Has the latest version been distributed without restrictions as to use or disclosure for more than one year (if yes, supply date of disclosure)?

17. Name(s) and signature(s) of innovator(s).

b. Interim NASA New Technology Summary Report: This report shall consist of a complete listing of subject inventions for the previous 12-month period or certification that there are none. Completion of Interim NASA New Technology Summary Report (NTSR) Form shall satisfy this reporting requirement. Use of the form utilizing the online system at http://www.webentre.nasa.gov/ is preferred; however an alternate format is acceptable provided all required information is provided.

c. Final NASA New Technology Summary Report: This report shall consist of a comprehensive list of all subject inventions for the duration of the contract or certification that there are none. Completion of Final NASA New Technology Summary Report (NTSR) Form shall satisfy this reporting requirement. Use of the form utilizing the online system at http://www.webentre.nasa.gov/ is preferred; however an alternate format is acceptable provided all required information is provided.

d. Report on utilization of subject inventions: This report provides information on the utilization of a subject invention or on efforts at obtaining such utilization that are being made by the contractor or its licensees or assignees. Per FAR 52.227-11, this report shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the contractor, and other data requested by the Contracting Officer.

15.4 **FORMAT**: The Disclosure of Invention and New Technology (Including Software) report may use NASA Form 1679 (latest revision) or the online system at: http://www.webentre.nasa.gov/, or provide sufficient information to meet the reporting requirement.

The interim and final NASA New Technology Reports may use NASA NTSR Form, Interim or Final (whichever is applicable) utilizing the online system at: http://www.webentre.nasa.gov/, or provide sufficient information to meet the reporting requirement.

15.5 **MAINTENANCE**: None required

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163CM-001**
3. **DATA TYPE**: 1
4. **DATE REVISED**:
5. **PAGE**: 1/2
6. **TITLE**: Acceptance Data Package

7. **DESCRIPTION/USE**: To provide the documentation needed by MSFC to establish the acceptability of equipment/software for deliverable products.

8. **OPR**: ED03 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Preliminary two weeks prior to each Acceptance Review (AR)

12. **SUBMISSION FREQUENCY**: Final with delivery of each Configuration Item (CI)

13. **REMARKS**:
14. **INTERRELATIONSHIP**: PWS paragraph 2.4

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Acceptance Data Package (ADP) contains the elements of documentation required to establish the acceptability of DEI products as requested in each customer order.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**:

a. The Acceptance Data Package shall include:
   1. Copy of Visual Manufacturing™ customer order and final work order.
   2. Copy of DD Form 250.
   3. Original work orders that specify Government mandatory inspection points (GMIPs).
   4. Final Deliverable End Item (DEI) configuration report/certification.
   5. DARs (waivers/deviations) and contractor MRB action discrepancy records.
   6. MSFC internal customer supplied product (ICPS) documentation submitted with articles and materials supplied by the customer, i.e. NASA MSFC parts tags (MSFC Form 312), log books (MSFC Form 3473), Temporary Installation Record (MSFC Form 4340), temporary red streamers (MSFC Tag 16) or other NASA Center or customer documentation.
   7. Generated log books when specified as an engineering requirement.
   8. Temporary Installation Record (MSFC Form 4340) as applicable for deliverable hardware products with attached Red Streamers (MSFC Tag 16).

b. Additional ADP to support specific customer requirements shall be specified on the customer order, which may include but are not limited to:
   1. Drawings, engineering orders, and engineering parts list.
   2. Results and draft of oven/furnace temperature survey.
   3. Results of processed representative sample specimens (hardness values and sketch) as required.
   4. Hardness values of each heat treated part, indicating the part number, serial number, and hardness.
   5. Material certification – chemical and/or physical test results.
   6. Nondestructive Evaluation (NDE) results and personnel certification.

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

7. Welder's certification/weld procedures.
8. Contractor miscellaneous inspection records.
9. Copy of work orders.
10. Alignment and Center of Gravity (CG) data.
11. Limited life data.
12. Cleanliness data.
13. Assembly integration data.

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: The ADP shall be maintained current for five (5) years.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163CM-002**
3. **DATA TYPE**: 2/3
4. **DATE REVISED**:
5. **PAGE**: 1/4

6. **TITLE**: Functional Configuration/Physical Configuration Audit Documentation

7. **DESCRIPTION/USE**: To support the Functional Configuration Audit (FCA) and Physical Configuration Audit (PCA). The FCA is an audit to verify performance of the CI against approved configuration documentation. The PCA is an audit of the configuration documentation and quality control records to ensure the as-built or as-coded configuration is defined in the documentation.

8. **OPR**: ED03 9. **DM**: ED03

10. **DISTRIBUTION**: See Attachment 2

11. **INITIAL SUBMISSION**: See Attachment 2

12. **SUBMISSION FREQUENCY**: Per configuration audit

13. **REMARKS**: MSFC will document audit planning and provide it to the contractor prior to the audit.
14. **INTERRELATIONSHIP**: PWS paragraph 2.4

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: Functional Configuration/Physical Configuration Audit Documentation contains the required documentation necessary to support the configuration audit for a configuration item (CI).

15.2 **APPLICABLE DOCUMENTS**:
MSFC-STD-3394 *Standard for Contractor Configuration Management MSFC Programs/Projects*

15.3 **CONTENTS**: Detailed content requirements shall be specified by MSFC to include Test and other required data for the FCA shall be that collected from the test of the configuration of the item that is to be formally accepted. The Physical Configuration Audit (PCA) is an audit to verify that the as-built configuration reflects the required physical characteristics documented in the as-designed configuration. Configuration and quality control records and other documents defining the as-built or as-coded configuration is defined in the documentation shall be provided.

MSFC-STD-3394 provides guidelines on documentation required for the FCA and PCA. See Attachment 1 for documentation required for the audits.

Additional documentation requirements to be provided are:

a. Agenda - The agenda shall specify the date, time and place for the scheduled audit, specific review items, supporting documentation, and key participants. Submit approved copies at the review. See Attachment 2.
b. Presentation Charts - Presentation charts shall be submitted at the start of the audit. They shall summarize the details contained in the data package and identify compliance with the contract requirements. See Attachment 2 for distribution and availability of data.

DRD Continuation Sheet

TITLE: Functional Configuration/Physical Configuration Audit Documentation **DRD NO.**: **1163CM-002**

DATA TYPE: 3 **PAGE**: 2/4

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

c. Plan – A plan shall be submitted prior to initiating the audit, stating configuration items to be reviewed; data required to perform the review; how open actions are tracked; defining success criteria; and providing for formal certification of the audit. The plan shall also define extent of contractor and government participation in the review.

d. Minutes - The minutes shall contain a description of the audit with sufficient detail to enable the audit to be made a matter of record. The minutes shall include the presentation charts, a listing of Findings, action items with actionee and suspense (closure) data, and identification of the documents which describe the approved baseline established at the conclusion of the PCA. See Attachment 2 for distribution and availability of data.

e. Findings - showing action items, actionees, suspense dates and closure status shall be submitted. See Attachment 2 for distribution and availability of data.

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: As required to correct errors and to maintain findings closure status.

Configuration Audit Required Data

Documentation required for FCA
(As applicable)

- Specifications.
- Drawings and parts list.
- ECPs and DARs incorporated and pending.
- Specification and drawing tree.
- Fracture control plan.
- Structural dynamics, analyses, loads, and models documentation (updated).
- Materials Usage Agreement (MUAs).
- Material Identification Usage List (MIUL).
- Certification of Qualification(s) (COQ's).
- Verification procedures and requirements.
- Complete list of successfully accomplished tests and test results.
- Complete list of successful tests if detailed test data are not recorded.
- Complete list of tests required but not performed.
- Software verification data.
- Software development documents.
- Software version description.
- Critical Design Review (CDR) RIDs and dispositions.
- Mission constraints.
- Nonconformance reports.
- Interface control drawings/documents.
- Hazard analysis/risk assessment.
- Test plans and procedures.
- Test reports.
- Verification closures.
- Verification tracking log.
- Analysis reports.
- ALERTS tracking log.

Documentation required for the PCA
(As applicable)

- Final version of all specifications.
- Product drawings and parts list.
- Configuration accounting and status reports.
- Final version of all software documents.
- Final version of software version description document.
- Copy of all FCA findings for each CI.
- List of approved and outstanding ECPs and DARs.
- Copies of ECPs and DARs as requested at the audit.
- Drawing and specification tree.
- Indentured parts list/as-designed configuration definition.
- As run test procedures (when applicable, include any test discrepancy records).
- Copy of parts tags or verification closure for verification items verified by inspection method.
- Manufacturing and inspection (build) records.
- Inspection records or inspection verification closures.
- As-built electronic data.
- Discrepancy Reports (DR's).
- Log Books.

ATTACHMENT 2

FCA/PCA Documentation
Distribution and Availability of Data

Document	Data Type	FCA Copies/Availability	PCA Copies/Availability
Agenda	2	One/15 days prior to audit, Approved copies at audit	One/15 days prior to audit, Approved copies at audit
Data Package	3	One/Two weeks prior to audit	One /Two weeks prior to audit
Presentation Charts	3	One for each attendee at audit	One for each attendee at audit
Minutes	2	One at audit/ copy to each attendee within two weeks	One at audit/one to each attendee within two weeks
Findings (generated at Reviews)	2	Provided as hard copy or electronically per the project specific Audit Plan.	Close out to be as specified in the project specific Audit Plan.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163LS-001**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/1

6. **TITLE**: Government Property Management Plan

7. **DESCRIPTION/USE**: To describe the method of controlling and managing Government property.

8. **OPR**: AS41 9. **DM**: ED03

10. **DISTRIBUTION**: Cognizant property administrator

11. **INITIAL SUBMISSION**: Preliminary three months after Authority to Proceed (ATP) (including phase-in period)

12. **SUBMISSION FREQUENCY**: Final one year after ATP, revise as required

13. **REMARKS**: This document shall be the official contract requirements document for the control and identification of all Government property.

14. **INTERRELATIONSHIP**: PWS paragraph 1.2.2

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Government Property Management Plan defines the contractor's methods of care, accounting, and control of Government property.

15.2 **APPLICABLE DOCUMENTS**:

FAR	*Federal Acquisition Regulation, Part 45*
NPR 5100.4B	*Federal Acquisition Regulation Supplement, (NASA/FAR Supplement) Part 18-45* and latest revisions thereto

15.3 **CONTENTS**: This plan shall satisfy the requirements of the documents listed in 15.2, and the contract. This plan shall consist of those procedures which constitute the contractor's property management system and shall include the following categories:

a. Property management.
b. Acquisition.
c. Receiving.
d. Identification.
e. Records.
f. Movement.
g. Storage.
h. Physical inventories.
i. Reports.
j. Consumption.
k. Utilization.
l. Maintenance.
m. Subcontractor control.
n. Disposition.
o. Contract close-out.

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163MA-001**
3. **DATA TYPE**: 1
4. **DATE REVISED**:
5. **PAGE**: 1/1

6. **TITLE**: Management Plan

7. **DESCRIPTION/USE**: To provide a description of the contractor's overall management system and organization for accomplishing the requirements set forth in the contract.

8. **OPR**: ED03 9. **DM:** ED03

10. **DISTRIBUTION:** Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Thirty (30) days after Authority to Proceed (ATP), (including phase-in period)

12. **SUBMISSION FREQUENCY**: Revise as required

13. **REMARKS**:
14. **INTERRELATIONSHIP**: PWS paragraph 1.1

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Management Plan shall describe the contractor's concept plans, practice, and approach for accomplishing the requirements set forth in the contract, i.e., managing and controlling project tasks, experimental work, and management interfaces. The plan shall be in such detail as necessary to convey the contractor's internal procedures.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Management Plan shall include:

a. Description of the project tasks to be accomplished and an outline of methods by which the contractor proposes to accomplish each task down to the level III WBS task level.
b. Description of management concepts, plans, project management and task/control systems, organizational approach, and communication channels between the contractor and the Government. This shall include descriptions, flow charts, schedules, and other documentation necessary to give a comprehensive plan of organization and accomplishment.
c. Receiving, estimating and processing customer orders through the fabrication and assembly of Research and Development (R&D) Space Flight and Associated Hardware.
d. Issuing, receiving, and controlling work done by subcontractor(s) to augment the fabrication and assembly capability.
e. Fabrication process planning and production control (which includes scheduling and monitoring shop work loads, expediting hardware and status of work orders).
f. Description of how outside/commercial work will be solicited, procured, managed, and scheduled. Description of how cost to customer is determined.

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or by complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163MA-002**
3. **DATA TYPE**: 1
4. **DATE REVISED**:
5. **PAGE**: 1/1
6. **TITLE**: Task Order Plan (TOP)

7. **DESCRIPTION/USE**: To provide a plan that satisfies the requirements set forth in a Task Order Request.

8. **OPR**: ED03 9. **DM:** ED03

10. **DISTRIBUTION:** Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Draft submitted within Five (5) days of Task Order Request (TOR) or modification request of an existing Task Order Plan

12. **SUBMISSION FREQUENCY**: Five (5) days of Task Order Request (TOR) or modification request of an existing Task Order Plan

13. **REMARKS**:
14. **INTERRELATIONSHIP**: PWS paragraph 1.1.1

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Task Order Plan contains the elements of documentation necessary to determine the contractor's understanding of the requirements set forth in the Task Order Request.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Task Order Plan shall include:

a. Contract Number.
b. Task Order Title.
c. Task Order Plan Number.
d. Period of Performance.
e. PR Number.
f. Task Manager.
g. Task Order Lead (contractor).
h. Task Order Description.
i. Technical Approach (including required input, guidelines and assumptions).
j. Discussion of skills required.
k. Special tools required.
l. Milestones and Deliverables.
m. Schedule.
n. Special considerations (recruiting, consulting, etc.).

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or by complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163MA-003**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/1

6. **TITLE**: Financial Management Report (533M)

7. **DESCRIPTION/USE**: To provide monthly financial reports for monitoring program costs. The 533 reports are the official cost documents used at NASA for cost type, price redetermination, and fixed price incentive contracts.

8. **OPR**: CS40 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Within 30 days after the incurrence of cost

12. **SUBMISSION FREQUENCY**: No later than 10 working days following the end of the contractor's accounting month

13. **REMARKS**:
14. **INTERRELATIONSHIP**: PWS paragraph 1.4

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Financial Management Report provides data on accumulated costs and funding projections for management of the contract.

15.2 **APPLICABLE DOCUMENTS**:

NFS 1852.242-73	*NASA Contractor Financial Management Reporting*, (November 2004)
NPR 9501.2D	*NASA Contractor Financial Management Reporting*

15.3 **CONTENTS**: The elements of cost for financial reporting shall be mutually agreed by the contractor and NASA project office and cover labor hours by function, direct labor cost, materials, subcontracts, interdivisional work, other direct rates, overhead by pool, fringe, G&A, and fee. Changes or additions to elements of cost shall be by mutual agreement between the contractor and the NASA project manager. The data contained in the reports shall be auditable using Generally Accepted Accounting Principles. The 533M Report shall include actuals and projections at the total contract level. A summary page at the contract level shall be included reflecting the cumulative since inception cost for the contract. The 533 shall list all costs by Employee & PWS/WBS.

15.4 **FORMAT**: The NASA Form 533M shall be prepared per NPR 9501.2D and NFS 1852.242-73. Contractor format is acceptable provided all necessary requirements are met. Electronic submission of contractor data is strongly encouraged.

15.5 **MAINTENANCE**: None required

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163MA-004**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/2
6. **TITLE**: Monthly Status Reports

7. **DESCRIPTION/USE**: To provide visibility to contractor and MSFC project management of actual and potential problems and progress toward meeting the cost, technical and schedule requirements.

8. **OPR**: ED03 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: First calendar month following the end of the first full month after Authority to Proceed (ATP), unless otherwise specified by the Contracting Officer

12. **SUBMISSION FREQUENCY**: 10 days following the end of each month

13. **REMARKS**:
14. **INTERRELATIONSHIP**: PWS paragraph 1.1.4

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Monthly Status Reports provides data for the assessment of monthly cost, technical and schedule progress and summarizes the results of the entire contract work.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Monthly Status Reports shall contain:

a. Work accomplished for current reporting period, including a report of overall cost, technical and schedule performance.
b. Cost breakdown spreadsheet providing all cost information by employee:
    1. Employee Name.
    2. PWS/WBS supported for each Employee PWS/WBS combination:
        (a) Hours on each PWS/WBS.
        (b) Overtime hours for each PWS/WBS.
        (c) Base Cost for hours.
        (d) Base Costs to government.
        (e) Overtime Costs to government.
        (f) Travel charged to government.
        (g) Training charged to government.
        (h) Procurement charged to government for PWS/WBS.
c. Work planned for next reporting period.
d. Current problems which impede performance or impact schedule or cost, and proposed corrective action.
e. Other information that assist the Government in evaluating the contractor's cost, technical and schedule performance, e.g., innovative processes and cost reduction initiatives.
f. Man-hours expended and cost in each Level I and II task per WBS for the current months and cumulative months, showing overtime hours separately.
g. Personnel statistical information, numbers by functional assignments, etc.

DRD Continuation Sheet

TITLE: Monthly Status Reports **DRD NO.**: **1163MA-004**
DATA TYPE: 3 **PAGE**: 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

h. Provide minutes for each of the reviews that include copies of all presentation charts (including back-up charts). Minutes shall be signed by the Contractor and MSFC.

i. The Final Report shall contain an overview of the entire contract effort.

j. Additional requirements may be imposed within a Task Order for delivery to the Task Manager.

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: None required

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163MA-005**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/1
6. **TITLE**: Badged Employee and Remote IT User Listing

7. **DESCRIPTION/USE**: To assist NASA in conducting contractor floor checks and to determine if the employees meet the minimum background investigation requirements.

8. **OPR**: AS50 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter. One copy each shall go to MSFC's Protective Services Office and Facilities Planning and Business Management Office.

11. **INITIAL SUBMISSION**: No later than 10 working days after Authority to Proceed (ATP), (including phase-in period)

12. **SUBMISSION FREQUENCY**: Formal update quarterly and email changes as personnel changes occur to distribution. If deemed necessary by the Contracting Officer, the contractor shall submit the list at times other than stated.

13. **REMARKS**: Reference is made to Federal Acquisition Regulation (FAR) Clause, FAR 52.215-2, *Audit and Records--Negotiations* (June 1999), NPR 1600.1, *NASA Security Program Procedural Requirements*.
14. **INTERRELATIONSHIP**: PWS paragraph 1.2.7

15. **DATA PREPARATION INFORMATION**:
15.1 **SCOPE**: The Badged Employee and Remote IT User Listing provides NASA with a list of all MSFC badged contractor employees, as well as, any contractor remote IT users who will have access to the MSFC IT system.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Badged Employee and Remote IT User Listing shall include the following information for each employee: employee's full name (first and middle names must be birth names), last four digits of the Social Security Number (SSN), date of birth, place of birth, duty position, duty location (building/room number), shift assignment, and supervisor's name. Additionally, if applicable, the type of security background check already completed (NACLC or SSBI) and the date it was completed.

15.4 **FORMAT**: Contractor format using Excel Spreadsheet is acceptable.

15.5 **MAINTENANCE**: None required

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163MA-006**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/1
6. **TITLE**: Contractor Employee Clearance Document

7. **DESCRIPTION/USE**: To ensure that badged contractor employees who no longer require Center access properly clear all accounts when the access is no longer needed.

8. **OPR**: AS50 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Immediately when the access is no longer needed

12. **SUBMISSION FREQUENCY**: As required

13. **REMARKS**:
14. **INTERRELATIONSHIP**: PWS paragraph 1.1.5

15. **DATA PREPARATION INFORMATION**:
15.1 **SCOPE**: The Contractor Employee Clearance Document provides verification that all badged employees have properly cleared all accounts when the access is no longer needed.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Contractor Employee Clearance Document shall contain all the information required by MSFC Form 383-1.

15.4 **FORMAT**: MSFC Form 383-1, "Contractor Employee Clearance Document".

15.5 **MAINTENANCE**: None required

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163MA-007**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/1

6. **TITLE**: Position Risk Designation for Non-NASA Employee

7. **DESCRIPTION/USE**: To ensure that contractor employees are screened to an appropriate risk determination in accordance with NPR 1600.1, *NASA Security Program Procedural Requirements*, Chapter 4.

8. **OPR**: AS50 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter. One copy shall go to MSFC Protective Services Office.

11. **INITIAL SUBMISSION**: No later than 10 working days after Authority to Proceed (ATP), (including phase-in period)

12. **SUBMISSION FREQUENCY**: Update as personnel or position changes occur

13. **REMARKS**:
14. **INTERRELATIONSHIP**: PWS paragraph 1.1.6

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Position Risk Designation for Non-NASA Employee provides information necessary to determine the type of investigation required and how closely an individual is screened for a position.

15.2 **APPLICABLE DOCUMENTS**:
NPR 1600.1 *NASA Security Program Procedural Requirements*

15.3 **CONTENTS**: The Position Risk Designation for Non-NASA Employee shall contain all the information required by NASA Form 1760 in accordance with NPR 1600.1, NASA Security Program Procedural Requirements.

15.4 **FORMAT**: NASA Form 1760, "Position Risk Designation for Non-NASA Employee", or as may otherwise be directed by the Contracting Officer.

15.5 **MAINTENANCE**: None required

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163MA-008**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/2
6. **TITLE**: Monthly and Semi-Annually Performance Reports

7. **DESCRIPTION/USE**: To provide visibility to contractor and MSFC technical monitor of actual and potential problems toward meeting established performance measurements in estimating, product delivery dates and quality of products.

8. **OPR**: ED03 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: First calendar month following the end of the first full month after Authority to Proceed (ATP), unless otherwise specified by the Contracting Officer

12. **SUBMISSION FREQUENCY**: Monthly: 10 days following the end of each month. Semi-Annually: 10 days following the end of the reporting period.

13. **REMARKS**:
14. **INTERRELATIONSHIP**: PWS paragraph 2.4

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Monthly and Semi-Annually Performance Reports provides data for the assessment of monthly customer orders and summarizes the performance results of PWS 2.4.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Monthly and Semi-Annually Performance Reports shall include:

a. The first monthly report shall contain:
   1. Customer Order Number.
   2. Metric (Fixed Cost, Delivery w/ Fixed Cost, Actuals).
   3. Order Date.
   4. Original Promised Date.
   5. Actual Completion Date.
   6. Duration.
   7. Days Early – Days Late.
   8. Hours Estimated.
   9. Actual Hours.
   10. Hours Deviation.
   11. % Deviation.
   12. Description of Customer Order.

b. The second monthly report shall contain:
   1. Identified jobs (by Customer Order) receiving a Non-Conformance.
   2. Number of total jobs completed during the month.
   3. Percentage of Non-conformance versus total jobs for the month (per job and hours).
   4. Identify jobs that receive "Rework".
   5. Identify jobs that receive "Use As Is".

DRD Continuation Sheet

TITLE: Monthly Status Reports **DRD NO.**: **1163MA-008**
DATA TYPE: 3 **PAGE**: 2/2

15.3 **DATA PREPARATION INFORMATION (CONTINUED)**:

6. Identify jobs that receive "Scrap".
7. Identified Non-Conformance job's original hours to complete.
8. Number of hours to correct Non-Conformance (even if "Scrapped").
9. Percentage of correction versus original total hours.

c. The Semi-Annually Report shall contain a summary of first and second monthly reports.

15.4 **FORMAT**: Microsoft Excel shall be utilized.

15.5 **MAINTENANCE**: None required

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163MA-009**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Organizational Conflict of Interest (OCI) Avoidance Plan

7. **DESCRIPTION/USE**: To demonstrate to the Government that the Contractor will mitigate organizational conflicts of interest and ensure that the contractor provides unbiased, impartial advice and adequately protects sensitive data.

8. **OPR**: PS21 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: 10 working days following Authority to Proceed (ATP) (including phase-in period)

12. **SUBMISSION FREQUENCY**: Update as required

13. **REMARKS**: Reference is made to Contract Clauses H.2, *Limitation of Future Contracting (NFS 1852.209-71*, H.3, *Organizational Conflicts of Interest*, I.7, *Access to Sensitive Information (NFS 1852.237-72),* and I.8, *Release of Sensitive Information (NFS 1852.237-73).*

14. **INTERRELATIONSHIP**: PWS paragraph 1.1

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Organizational Conflicts of Interest Avoidance Plan demonstrates that no organizational conflict of interest exists or that any such potential conflicts have been adequately avoided or mitigated with any prime contractor or subcontractor performing or planning to propose on design, development, and/or delivery of space flight hardware, software, mission integration services or other critical systems related to MSFC. The Contractor should not assume that government performance of a contracted task is a form of mitigation.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Organizational Conflict of Interest Avoidance Plan shall include the following:

a. Organizational conflicts of interest pertaining to impaired objectivity shall be addressed as follows:
    1. Describe the nature of the conflict including any business relationships that might create a conflict with the performance of the work statement
    2. Describe the plan for avoiding, neutralizing, or mitigating the conflict, including the following with regard to subject matter experts/technical experts if applicable:
        (a) That the management reporting chains between this contract and the work performed by the subject matter experts/technical experts for the conflicting business relationship are separated from each other.
        (b) That the subject matter experts/technical experts when performing under this contract are physically separated from the portion of the company performing the work for the conflicting business relationships.

DRD Continuation Sheet

TITLE: Organizational Conflict of Interest (OCI) Avoidance Plan **DRD NO.**: **1163MA-009**
DATA TYPE: 2 **PAGE**: 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

(c) That each subject matter expert/technical expert performing under this contract signs an express, binding, written agreement setting forth all responsibilities and duties to avoid organizational conflicts of interest and to protect sensitive data provided under this order.

(d) That techniques are in place to ensure that the contractor shall not favor the conflicting business relationships and will avoid the appearance of conflicts of interest.

b. With regard to access to nonpublic information, the avoidance plan shall contain a plan to safeguard all proprietary/sensitive data the contractor (including all employees and subject matter experts/technical experts) receives. This plan shall include:

1. A provision that the contractor shall not disclose or improperly use the proprietary/sensitive data received or accessed under this contract.
2. A provision that information, whether in hard copy or on electronic media, shall be marked, handled, stored, and destroyed in order to preclude an unauthorized disclosure of information.
3. A provision that information technology shall be protected to prevent unauthorized disclosure of information.
4. A provision that employees performing the effort must sign an express binding written agreement clearly agreeing to protect sensitive data.
5. A requirement that subcontractors have appropriate OCI avoidance procedures in place for the use of subject matter experts.
6. A requirement for periodic self-audits, the results of which shall be made available to the Government.
7. Initial and periodic refresher OCI training for the contractor employees/experts working on this contract.
8. A description of organizational and employee sanctions for violation of the OCI order clause or OCI Avoidance Plan provisions.
9. Provisions on record keeping requirements regarding OCI (e.g., training, written agreements). The contractor shall make these records available to and cooperate with any neutral third party the Government assigns to review adherence to their OCI mitigation plan.
10. A provision requiring the contractor to report any real, apparent, or potential conflict of interest that may arise to the Contracting Officer.
11. A provision requiring the contractor to update the OCI Avoidance Plan upon occurrence of any event that will cause a change to the plan.

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163QE-001**
3. **DATA TYPE**: 1
4. **DATE REVISED**:
5. **PAGE**: 1/2
6. **TITLE**: Quality Management System Plan

7. **DESCRIPTION/USE**: To define the contractor's planned methods for accomplishing the applicable tasks required to satisfy the quality requirements of NPD 8730.5 for the specific products and engineering technical support being procured.

8. **OPR**: QD40 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Four (4) months after Authority to Proceed (ATP), (including phase-in period)

12. **SUBMISSION FREQUENCY**: Revise as required to address new or changed Task Orders with submission as agreed upon through the COTR.

13. **REMARKS**: A copy of the current Quality System Manual will be provided to the Contractor upon contract award
14. **INTERRELATIONSHIP**: PWS paragraph 1.1.7

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Quality Management System Plan shall identify, as applicable, the specific quality management system activities related to the procurement of materials/subcomponents, fabrication, assembly, and engineering technical support and services to assure the quality of the products delivered. The plan(s) will reference the contractor's quality manual and procedures as necessary to fully describe the contractor's quality system. Quality planning can be prepared as a single plan or a top level plan with separate task level planning, or any combination thereof. Updates to planning shall be addressed for any additional tasks added to the contract or for any changes if required.

15.2 **APPLICABLE DOCUMENTS**:

NPD 8730.5	*NASA Quality Assurance Program Policy*
NPR 8735.2	*Management of Government Safety and Mission Assurance Surveillance Functions for NASA Contracts*
SAE AS9100	*Quality Management Systems - Aerospace – Requirements*

15.3 **CONTENTS**: Each quality element of SAE AS9100 (excluding Section 7.3 "Design and Development") shall be addressed to describe the philosophy and approach for implementation of the quality management system. This can be satisfied by contractor's existing quality manual and procedures. The only exceptions allowed will be processes noted in Section 7 of SAE AS9100 and as specified in the contract Performance Work Statement (PWS) and/or in each task agreement. A copy of the Quality System Manual and 1st tier procedures shall be submitted with any required quality plan. As a minimum, the subparagraphs below shall be addressed by the quality plan to include details of responsibilities and controls to adequately describe the specific quality assurance and personnel resource activities related to hardware and technical support being procured by MSFC:

a. NASA MSFC Performance Work Statement (PWS) Activities – describe how hardware specific quality requirements imposed by contract or component/equipment specification will be assured (i.e., traceability requirements, specific inspection points, specific quality activities).

DRD Continuation Sheet

TITLE: Quality Management System Plan **DRD NO.**: **1163QE-001**

DATA TYPE: 1 **PAGE**: 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

b. Responsibilities – describe which contractor organizations will be responsible to perform the applicable quality management system activities which need to include how the Contractor will support the MSFC requirements specified in the Contract Surveillance Plan (Reference NPR 8735.2).

c. Article, Material, and Service Controls - describe the level of article, material, and service control including traceability requirements invoked by the contractor for the articles, materials, and/or services used in or performed as part of the hardware design and maintenance criteria, including how quality is assured for each material, part, assembly, and/or service performed.

d. Procurement – include the procurement quality requirements for all materials/parts/ components the contractor purchases. Define the level of control exercised over the suppliers including how suppliers are monitored, and maintained with controls for supplier nonconformances processing in reference to the requirements in section 4.2 of the PWS.

e. Milestone Reviews – describe how the contractor's quality system will support milestone reviews as requested by MSFC.

f. Configuration Assurance – describe how the configuration of the hardware build is compared and verified to the approved design baseline drawings and specifications as requested by NASA. Describe how the configuration of Government Furnished Property/Equipment is maintained.

g. Special Process Controls – describe special process controls implemented for in-house processes and, if applicable, for sub-tier supplier processes. Controls will include required training, certification, and maintenance of competency for technical personnel.

h. Inspection and Test (describe who will be responsible to perform inspections to include any limitations) – include: how the quality of purchased items is validated at receiving inspection or at sub-tier suppliers facilities, specific in-process (manufacturing) inspections performed, details of final inspection and pre-ship inspections.

i. Nonconformance Processing - describe how nonconformance will be documented and dispositioned as specified in the PWS, section 4.2.

j. Record retention – for those records not delivered to MSFC, specify which records are required to be kept, who keeps them, for how long, and how they are to be dispositioned at the end of the retention period, and/or as specified in the contract.

k. Personnel training and competency processes will need to be specified for all personnel who affect products and technical support delivered on this contract. Resources for training to the requirements of this contract, specified by special processes, will be provided by MSFC. Contractor training management communication with MSFC will need to be specified to assure adequate resources to maintain special process personnel competency.

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163SA-001**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/4
6. **TITLE**: Safety, Health, and Environmental (SHE) Plan

7. **DESCRIPTION/USE**: To provide the contractor and the Government a baseline document to (1) prevent employee fatalities, (2) reduce the number of incidents, (3) reduce the severity of employee injuries and illnesses, and (4) protect the environment through the ongoing planning, implementation, integration and management control of the contractor's industrial safety, occupational health, and environmental program by compliance with the Marshall Space Flight Center (MSFC) SHE core program requirements in accordance with NFS 1852.223-73.

8. **OPR**: AS10/QD50 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Detailed Draft with proposal

12. **SUBMISSION FREQUENCY**: Ten days after Authority to Proceed (ATP), (including phase-in period); update as required

13. **REMARKS**:
14. **INTERRELATIONSHIP:** NFS 1852.223-70, *Safety and Health;* NFS 1852.223-73, *Safety and Health Plan*; FAR 52.223-3, *Hazardous Material Identification and Material Safety Data*; FAR 52.223-4, *Recovered Material Certification*; FAR 52.223-5, *Pollution Prevention and Right-to-Know Information*; FAR 52.223-7, *Notice of Radioactive Materials*; FAR 52.223-9, *Estimate of Percentage of Recovered Material Content for EPA-Designated Products*; FAR 52.223-10, *Waste Reduction Program*; FAR 52.223-11, *Ozone Depleting Substances*; FAR 52.223-12, *Refrigeration Equipment and Air Conditioners*; FAR 52.223-13, *Certification of Toxic Chemical Release Reporting*; and FAR 52.223-14, *Toxic Chemical Release Reporting*. DRD 1163SA-002, *Mishap and Safety Statistics Report*. PWS paragraph 1.3

15. **DATA PREPARATION INFORMATION**:
15.1 **SCOPE**: The Safety, Health, and Environmental Plan shall describe the contractor's methods of planning, implementing and controlling their industrial safety, occupational health, and environmental requirements over the duration of the contract.

15.2 **APPLICABLE DOCUMENTS**: Compliance with the following Occupational Safety and Health Standards and applicable requirements shall be specified in the plan (if applicable to the scope of this contract).

29 CFR 1910	*Department of Labor; Occupational Safety and Health Administration Standards for General Industry*
29 CFR 1926	*Department of Labor; Occupational Safety and Health Administration Standards for Construction Industry*
40 CFR	*Protection of the Environment*

ANSI Standards applicable to the scope of this contract
ASME Boiler and Pressure Vessel Code applicable to the scope of this contract
NFPA Standards *National Fire Codes*

NASA-STD-8719.11	*Safety Standard for Fire Protection*
NPR 8715.3	*NASA General Safety Program Requirements*
MPR 1040.3	*MSFC Emergency Plan*

DRD Continuation Sheet

TITLE: Safety, Health, and Environmental (SHE) Plan **DRD NO.**: **1163SA-001**
DATA TYPE: 2 **PAGE**: 2/4

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

MPD 1800.1	*MSFC Smoking Policy*
MPR 1800.1	*Bloodborne Pathogens*
MPR 1810.1	*MSFC Occupational Medicine*
MPD 1840.1	*MSFC Environmental Health Program*
MPR 1840.1	*MSFC Confined Space Entries*
MPD 1840.2	*MSFC Hearing Conservation Program*
MPR 1840.2	*MSFC Hazard Communication Program*
MPD 1840.3	*MSFC Respiratory Protection Program*
MPR 1840.3	*MSFC Hazardous Chemicals in Laboratories Protection Program*
MPD 1860.1	*Laser Safety*
MPD 1860.2	*MSFC Radiation Safety Program*
MPR 3410.1	*Training*
MWI 3410.1	*Personnel Certification Program*
MPD 8500.1	*MSFC Environmental Management Policy*
MPR 8500.1	*MSFC Environmental Management Program*
MPR 8500.2	*MSFC Environmental Management System Manual*
MWI 8540.2	*Affirmative Procurement Program for Environmentally Preferable Products*
MWI 8550.1	*Waste Management*
MWI 8550.2	*Storm Water Management*
MWI 8550.3	*Wastewater Compliance*
MWI 8550.4	*Air Emissions Compliance*
MWI 8550.5	*Chemical Management*
MWI 8621.1	*Close Call and Mishap Reporting and Investigation Program*
MPR 8715.1	*Marshall Safety, Health and Environmental (SHE) Program*
MWI 8715.1	*Electrical Safety*
MWI 8715.2	*Lockout/Tagout Program*
MWI 8715.3	*Hazard Identification & Warning System*
MWI 8715.4	*Personal Protective Equipment (PPE)*
MWI 8715.5	*Building Manager Program*
MWI 8715.9	*Occupational Safety Guidelines for Contractors*
MWI 8715.10	*Explosives, Propellants, & Pyrotechnics Program*
MWI 8715.11	*Fire Safety Program*
MWI 8715.12	*Safety, Health, and Environmental Finding Tracking System (SHEtrak)*
MWI 8715.13	*Safety Concerns Reporting System (SCRS)*
MWI 8715.15	*Ground Operations Safety Assessment & Risk Mitigation Program*
MPD 8900.1	*Medical Operations Responsibilities for Human Space Flight Programs* (NOTE: This document only applies to Space Station contracts)

15.3 **CONTENTS**: The Safety, Health, and Environmental (SHE) Plan shall clearly describe how the contractor shall comply with the MSFC SHE core program requirements listed below to accomplish the following: (1) the methods to ensure compliance with the MSFC SHE core program requirements listed below, (2) the methods to ensure potentially hazardous conditions are identified and corrected, (3) the methods to ensure employees are trained to perform their tasks in a safe and healthful manner, and (4) the methods to ensure compliance with the applicable documents that pertain to the specific work tasks.

DRD Continuation Sheet

TITLE: Safety, Health, and Environmental (SHE) Plan **DRD NO.**: **1163SA-001**
DATA TYPE: 2 **PAGE**: 3/4

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

a. Management leadership and employee involvement:
   1. A statement of the management policy and their commitment to (1) provide a safe and healthful workplace for personnel (i.e., employees, customers, and public), (2) protect the property and the environment, and (3) ensure compliance with EPA, OSHA and NASA requirements applicable to the contracted effort.
   2. A description of how management and employees are held accountable for implementing their tasks in a safe and healthful manner while protecting the environment through the use of motivational or innovative techniques and when necessary through the use of a disciplinary program.
   3. A description of safety, health, environmental awareness and motivation programs that, include documented safety meetings and safety awareness training for employees. (Onsite contractors shall document their safety meeting statistics in the MSFC Supervisors Safety Web page (SSWP).
   4. A method of performing and documenting self evaluations of the contractor's safety, health and environmental program including the frequency of these evaluations.
   5. A method of ensuring the flowdown of MSFC safety, health, and environmental responsibilities and requirements applicable to the contracted effort are passed between all company levels and to all subcontractors, when applicable.
   6. The identification by title the individual who is assigned the responsibility for implementing the contractor's SHE program elements and serve as the SHE Point of Contact (POC) for the contracted effort.
   7. A method to ensure compliance with MPR 8715.1 and all other SHE documents that are applicable to the contracted effort.
   8. A method to ensure that each employee has read the SHE plan and fully understands their roles and responsibilities in supporting the MSFC SHE program.
   9. A method to ensure the SHE plan is reviewed annually and updated as necessary.

b. System and worksite analysis:
   1. The methods of identifying potentially hazardous conditions in the work area and operations, e.g., hazard analysis, safety assessment, change analysis, risk assessment and employee identified concerns.
   2. A description of the OSHA programs that require documented programs that are applicable to the contracted effort (e.g., Respiratory Protection, Hazard Communication, Confined Space, and Lockout/Tagout, etc. Address their interrelationships with the applicable MSFC SHE programs.)
   3. The methods of conducting and documenting supervisors' monthly safety visits. Onsite safety visits shall be performed once per month per supervisor and documented in the Supervisors Safety Web page.

c. Hazard prevention and control:
   1. The methods of controlling potentially hazardous conditions in the work area or in operations. This includes the generation of plans, procedures, and other working documents which clearly identify the hazardous situations in the work are or operation and the necessary cautions taken to mitigate the hazards. NOTE: MSFC requires an annual review of these plans and procedures. MSFC Safety Department concurrence is required for onsite hazardous procedures.
   2. The methods of ensuring controls over the procurement, storage, issuance, and use of hazardous chemical and materials are in accordance with MPR 8500.1 and the recycling and disposal of any hazardous waste is in accordance with MWI 8550.1.

DRD Continuation Sheet

TITLE: Safety, Health, and Environmental (SHE) Plan **DRD NO.**: **1163SA-001**
DATA TYPE: 2 **PAGE**: 4/4

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

3. The methods of ensuring a documented emergency management program. Include a list of contractor emergency points that are located onsite. (Note: Onsite contractors may use MPR 1040.3.)

4. The methods of ensuring the investigation of all mishaps and close calls to determine root cause and the reporting requirements are in accordance with MWI 8621.1. (Reference DRD 1163SA-002, *Mishap and Safety Statistics Report*).
5. The method for providing safety, health, and environmental services applicable to the contracted effort such as hazardous waste disposal, industrial hygiene monitoring, emergency medical support, hearing conservation program, respiratory protection, and hazard communication. (Note in the SHE plan which, if any of these services are to be provided by MSFC for onsite work.)
6. The methods employees have to suspend work where safety, health or environmental conditions warrant such action.

d. Safety, health and environmental training:

1. The methods for ensuring each employee is trained to recognize hazards, avoid accidents, know the hazards specific to their job, and fully understands the contractor's disciplinary program.

2. The methods for assessing employee training needs specific to their job. (Onsite employee assessments shall be performed using the SHE Training Assessment located on the MSFC Supervisor Safety Web Page.)

3. The methods for training and documenting this training when designating employees to be competent, qualified, authorized or certified to perform operations that require specific training in accordance with 29 CFR 1910 or 29 CFR 1926.
4. A list of identified job categories under the contracted effort that require MSFC safety certification in accordance with MWI 3410.1, "Personnel Certification Program". Example job categories that require MSFC safety certification include, but not limited to, operating MSFC lifting equipment (forklifts, cranes, etc.), working with chemicals, hazardous waste, pressure systems, etc. Personnel Certification for onsite job categories identified in MWI 3410.1 shall be tracked in the MSFC Certification Database (CERTRAK). (NOTE: offsite contracts shall list the job categories under the contracted effort that require OSHA documented training and certification.)

e. Environmental compliance – The methods to ensure compliance with environmental laws and regulations 40 CFR, Alabama Department of Environmental Management (ADEM), and MPR 8500.1 by:

1. Reporting hazardous and toxic substance use.
2. Implementing and reporting green procurements in accordance with MWI 8540.2.
3. Reducing, reusing, and recycling of hazardous and toxic substances prior to disposal in accordance with MWI 8550.1.
4. Minimizing stormwater pollution in accordance with MWI 8550.2.
5. Ensuring equipment and processes permitted by applicable laws.
6. Disposing of solid and liquid materials as permitted by applicable laws.

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163SA-002**
3. **DATA TYPE**: 1
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Personnel Certification Plan

7. **DESCRIPTION/USE**: To provide the contractor and the Government a baseline document for the identification and definition of personnel certification criteria and the procedures to be implemented by the contractor to ensure a certification program is implemented.

8. **OPR**: QD40 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: 30 days after Authority to Proceed (ATP), (including phase-in period)

12. **SUBMISSION FREQUENCY**: Revise as required

13. **REMARKS:** Where the contractor is operating under its own quality management system and processes, manufacturing special/critical process personnel qualification/certification controls are not included in this plan, they will be documented as specified in PWS paragraph 1.1.7, DRD 1163QE-001, and contract attachment J-20, NASA MSFC Safety & Mission Assurance Surveillance Plan.

14. **INTERRELATIONSHIP**: PWS paragraphs 1.1.2 and 1.1.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: It is mandatory that test facility operations activities be performed by certified personnel. The Personnel Certification Plan provides for training, certification, and re-certification of personnel engaged in the performance of MSFC critical processes. The purpose of a certification program is to assure that all personnel are capable of performing these MSFC critical processes and work assignments without endangering themselves, fellow employees, equipment and/or facilities. It is mandatory that these MSFC critical processes are performed by experienced and certified personnel.

15.2 **APPLICABLE DOCUMENTS**:

MWI 3410.1	*Personnel Certification Program*
NPR 8715.3	*NASA Safety Manual*

15.3 **CONTENTS:** The Personnel Certification Plan shall provide insight to the contractor's certification program. The plan shall include criteria which the contractor can relate directly to work classifications and the required skills, education, experience, training, and other qualifications necessary to perform work in these classifications. The contractor shall assure work performed by these classifications is performed with high quality workmanship to produce a high quality produce in a safe and efficient manner. The plan shall include the contractor methods to track these certifications. The contractor can elect to track their certifications for critical MSFC owned process in MSFC CERTRAK database in accordance with MWI 3410.1. The plan shall fulfill the requirements of the applicable documents listed in 15.2 and include the following:

a. Certification program:
   1. General:
      (a) Program description.
      (b) Program administration.
      (c) Certification duration.
      (d) Definitions.
      (e) Job description summaries.
      (f) Task assignments per job description.
      (g) Skills required per job description.

DRD Continuation Sheet

TITLE: Personnel Certification Plan **DRD NO.**: **1163SA-002**

DATA TYPE: 1 **PAGE**: 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED):**

2. Certification requirements/skills
   (a) Education.
   (b) Experience/work history.
   (c) Specialized training.
   (d) Physical condition/attitude.
3. Certification process:
   (a) Supervision responsibilities.
   (b) Certifying authority.
   (c) Formal/informal examination.
   (d) Proficiency demonstration.

b. Certification documentation.

Specific critical MSFC owned process skills requiring certification and proficiency include the following:

a. High pressure tubing fabrication and assembly.
b. Welding:
   1. Carbon steel.
   2. Stainless steel.
   3. Aluminum.
c. Control system operations.
d. Schematic drawing comprehension
e. Other processes identified by the Statement of Work (SOW)

The following certifications, if required, are obtained in accordance with MWI 3410.1

a. Forklift, crane and hoist operators.
b. Cryogenic and other hazardous pressure system operators.
c. Propellant & Explosive Handlers
c. Hazardous chemical/toxic material handling.
d. Confined space entry.
e. Electrical/instrumentation cable fabrication (including test articles):
   1. Crimping.
   2. Cabling, Harnessing, and Wiring.
   3. Soldering including Surface Mount Technology (SMT).
   4. Staking and Conformal Coating
   5. ESD Control
f. Welding inspection and nondestructive evaluation (NDE).
   1. Penetrant Testing
   2. Magnetic Particle Testing
   3. Eddy Current Testing
   4. Radiographic Testing
   5. Thermal/Infrared Testing
   6. Visual Testing

15.4 **FORMAT:** Contractor format is acceptable.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1163 **ISSUE**: RFP
2. **DRD NO.**: **1163SA-003**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/3
6. **TITLE**: Mishap and Safety Statistics Reports

7. **DESCRIPTION/USE**: To provide reporting of metrics, mishaps, close calls, and serious non-occupational injuries or illnesses.

8. **OPR**: QD50 9. **DM**: ED03

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**:
    a. Safety Statistics submitted by the 10th of each month after contract award using one of the following methods: MSFC Form 4371, or electronic notification system equivalent, or direct to NASA Incident Reporting Information System (IRIS) database. Statistics required to be submitted include: contract number, subcontractors, NAISC codes, number of employees, and number of supervisors, hours worked. Access to IRIS database can be obtained from the Industrial Safety Department after contract award. (Applicable to all onsite contracts)
    b. Mishaps, Close Calls, and serious non-occupational injuries or illnesses as defined in Section 15.6 and in NPR 8621.1:
        1. Type A, B, mishaps, high visibility mishaps or close calls: Upon occurrence or awareness of mishap:
            a. Immediate notification to the Contracting Officer and Industrial Safety (256-544-HELP, Safety Option) (Include location and time of incident, number of fatalities, number hospitalized, type of damage, estimated cost, brief description, and contact person's name and phone number), accompanied by IRIS Quick Incident submittal.
            b. Update within 24 hours through IRIS entry, or electronic submittal (per NPR 8621.1, paragraph 1.5.5).
        2. Non-occupational fatality or serious injury occurring onsite or to an onsite contractor employee: Notification to Contracting Officer and Industrial Safety within 24 hour of occurrence or awareness. (Offsite non-occupational injury or illness notification is at the discretion of the family.)
        3. Type C mishaps: Upon occurrence or awareness of mishap:
            a. Immediate notification to the Contracting Officer and Industrial Safety (256-544-HELP, Safety Option) (Include location and time of incident, type of lost-time injury or damage, estimated cost, brief description, and contact person's name and phone number), accompanied by IRIS Quick Incident submittal.
            b. Update within 6 days through IRIS entry, or electronic submittal.
        4. Type D, and Close Call mishaps (**Onsite**): Notification by telephone (256-544-HELP, Safety Option) or electronic submittal within 4 hours of occurrence or awareness, and within 24 hours with IRIS Quick Incident. Update within 6 days may be through IRIS entry, or electronic submittal.
        5. Type A, B, and Close Calls with high Type A or B potential: Mishap Board Report submitted after completion of investigation. Corrective Action Plan submitted upon Endorsing Official approval.
        6. All Mishaps: Follow-up Corrective Action Plan/Status 30 days after first mishap.
    c. Safety Concerns, Hazards, and non-reportable mishaps should be reported per MPR 8715.1 (**Onsite)** or the appropriate contractor method (**Offsite).**

DRD Continuation Sheet

TITLE: Mishap and Safety Statistics Reports **DRD NO.**: **1163SA-003**

DATA TYPE: 3 **PAGE**: 2/3

12. **SUBMISSION FREQUENCY**: Safety Statistics (MSFC Form 4371, IRIS entry, or equivalent) - By the 10th of each month. All Mishaps: Monthly Follow-up Corrective Action Plan/Status until corrective actions implemented and closure received by updating record in IRIS data base (preferred) or electronic submittal.

13. **REMARKS**:

14. **INTERRELATIONSHIP**: DRD 1163SA-001, *Safety, Health, and Environmental (SHE) Plan*. PWS paragraph 1.3

15. **DATA PREPARATION INFORMATION:**

15.1 **SCOPE**: The Mishap and Safety Statistics Reports document all mishaps and close calls as required in NPR 8621.1.

15.2 **APPLICABLE DOCUMENTS**:

NPR 8621.1	*NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping*
MPR 8715.1	*MSFC Safety, Health, and Environmental (SHE) Program*
MWI 8621.1	*Close Call and Mishap Reporting and Investigation Program*

15.3 **CONTENTS**: The Mishap and Safety Statistics Reports shall contain the information required by NPR 8621.1 and MWI 8621.1.

15.4 **FORMAT**: The following formats or electronic equivalent shall be submitted:

a. MSFC Form 4370, "MSFC Flash Mishap Report."
b. Additional Information Submittal per NPR 8621.1.
c. MSFC Form 4371, "MSFC Contractor Accident and Safety Statistics."
d. Mishap Board Report using the format provided in NPR 8621.1.

15.5 **MAINTENANCE**: None required

15.6 **DEFINITIONS**:

Close Call. An event in which there is no injury or only minor injury requiring first aid and/or no equipment/property damage or minor equipment/property damage (less than $1000), but which possesses a potential to cause a mishap.

High Visibility (Mishaps or Close Calls). Those particular mishaps or close calls, regardless of the amount of property damage or personnel injury, that the Administrator, Chief/OSMA, CD, AA/OIA, or the Center SMA director judges to possess a high degree of programmatic impact or public, media, or political interest including, but not limited to, mishaps and close calls that impact flight hardware, flight software, or completion of critical mission milestones.

Type A Mishap. A mishap resulting in one or more of the following: (1) an occupational injury or illness resulting in a fatality, a permanent total disability, or the hospitalization for inpatient care of 3 or more people within 30 workdays of the mishap; (2) a total direct cost of mission failure and property damage of $1 million or more; (3) a crewed aircraft hull loss; (4) an occurrence of an unexpected aircraft departure from controlled flight (except high performance jet/test aircraft such as F-15, F-16, F/A-18, T-38, OV-10, and T-34, when engaged in flight test activities).

DRD Continuation Sheet

TITLE: Mishap and Safety Statistics Reports **DRD NO.**: **1163SA-003**

DATA TYPE: 3 **PAGE**: 3/3

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

Type B Mishap. A mishap that caused an occupational injury or illness that resulted in a permanent partial disability, the hospitalization for inpatient care of 1-2 people within 30 workdays of the mishap, or a total direct cost of mission failure and property damage of at least $250,000 but less than $1,000,000.

Type C Mishap. A mishap resulting in a nonfatal occupational injury or illness that caused any days away from work, restricted duty, or transfer to another job beyond the day or shift on which it occurred, or a total direct cost of mission failure and property damage of at least $25,000 but less than $250,000.

Type D Mishap. A mishap that caused any nonfatal OSHA recordable occupational injury and/or illness that does not meet the definition of a Type C mishap, or a total direct cost of mission failure and property damage of at least $1,000 but less than $25,000.

ATTACHMENT J-3

WBS Breakdown for Engineering Technicians and Trades Support (METTS) Services Contract

1.0 Management

- 1.1 Contract Management
  - 1.1.1 Task Management
  - 1.1.2 Contractor Employee Center-wide Training and Certifications
  - 1.1.3 Contractor Employee Specialized Training and Unique Certifications
  - 1.1.4 Monthly Status Reports
  - 1.1.5 Contractor Employee Clearance Document
  - 1.1.6 Position Risk Designation for Non-NASA Employee
  - 1.1.7 Quality Systems Management
- 1.2 Planning and Control
  - 1.2.1 Work Management
  - 1.2.2 Property Management
  - 1.2.3 Technology Reports
  - 1.2.4 Security and Information Technology
  - 1.2.5 Contractor Employee Travel
  - 1.2.6 Contractor Employee Overtime
  - 1.2.7 Badged Employee and Remote IT User Listing
  - 1.2.8 Commercial Work
  - 1.2.9 Contractor Procurements
    - 1.2.9.1 Operations
    - 1.2.9.2 Direct
- 1.3 Safety, Health and Environmental
- 1.4 Financial Reporting

2.0 Mission Services Technicians and Trades Support

- 2.1 Materials Testing
  - 2.1.1 Promoted Ignition-Combustion Testing
  - 2.1.2 Flammability Testing
  - 2.1.3 Liquid and Gaseous Oxygen Mechanical Impact Testing
  - 2.1.4 Advanced Materials Ignition/Combustion Testing
  - 2.1.5 Thermal Vacuum Stability (Outgassing) Testing
  - 2.1.6 Toxic Offgassing (Toxicity) Testing
  - 2.1.7 Test Sample Verification and Preparation
  - 2.1.8 Engineering Analysis of Materials Testing, Data, and Results
  - 2.1.9 Test Innovations
  - 2.1.10 Oxygen Compatibility Assessments
  - 2.1.11 Development of Internal, Scientific and Data Documentation and Publications
  - 2.1.12 Materials Research and Special Studies
- 2.2 ETF/EFDTF Test Support
  - 2.2.1 Planning and Control
  - 2.2.2 Maintenance and Repair
  - 2.2.3 Test Coordination and Scheduling
  - 2.2.4 ETF Chamber Operations and Support
  - 2.2.5 EFDTF Facilities Operations and Support

2.3 Structural Test Support
- 2.3.1 Structural Test Facility Planning and Control
- 2.3.2 Structural test Facility Support
- 2.3.3 Master Schedule

2.4 Fabrication and Assembly of R&D Space Flight and Associated Hardware
- 2.4.1 Precision and General Assembly
- 2.4.2 Machining
- 2.4.3 Sheet Metal
- 2.4.4 Surface Treatment
- 2.4.5 Welding and Heat Treatment
- 2.4.6 Fabric Shop
- 2.4.7 Maintenance
- 2.4.8 Calibration
- 2.4.9 Chemical Analysis
- 2.4.10 Quality Control
- 2.4.11 Planning and Control

2.5 Electrical Fabrication, Test, and Assembly
- 2.5.1 Fabrication
- 2.5.2 Testing
- 2.5.3 Assembly
- 2.5.4 Calibrating
- 2.5.5 Quality Control

2.6 Reserved

2.7 Space Environmental Effects Testing
- 2.7.1 Contamination Control Support
- 2.7.2 Space Environmental Effects Testing
- 2.7.3 Electrostatic Levitator (ESL) Systems Operations
- 2.7.4 Development of Internal, Scientific and Data Documentation and Publications

2.8 Reserved

2.9 Environmental Gas Laboratory Support

2.10 Computer Aided Design Drawing

2.11 Data Analysis and Database Entry for Material and Processes Technical Information System (MAPTIS)

2.12 Optics Support

2.13 Tool Crib Operations

3.0 IDIQ Support

3.1 Materials Testing

3.2 ETF/EFDTF Test Support

3.3 Structural Test Support

3.4 Fabrication and Assembly of R&D Space Flight and Associated Hardware

3.5 Electrical Fabrication, Test, and Assembly

3.6 Calibration

3.7 Space Environmental Effects Testing

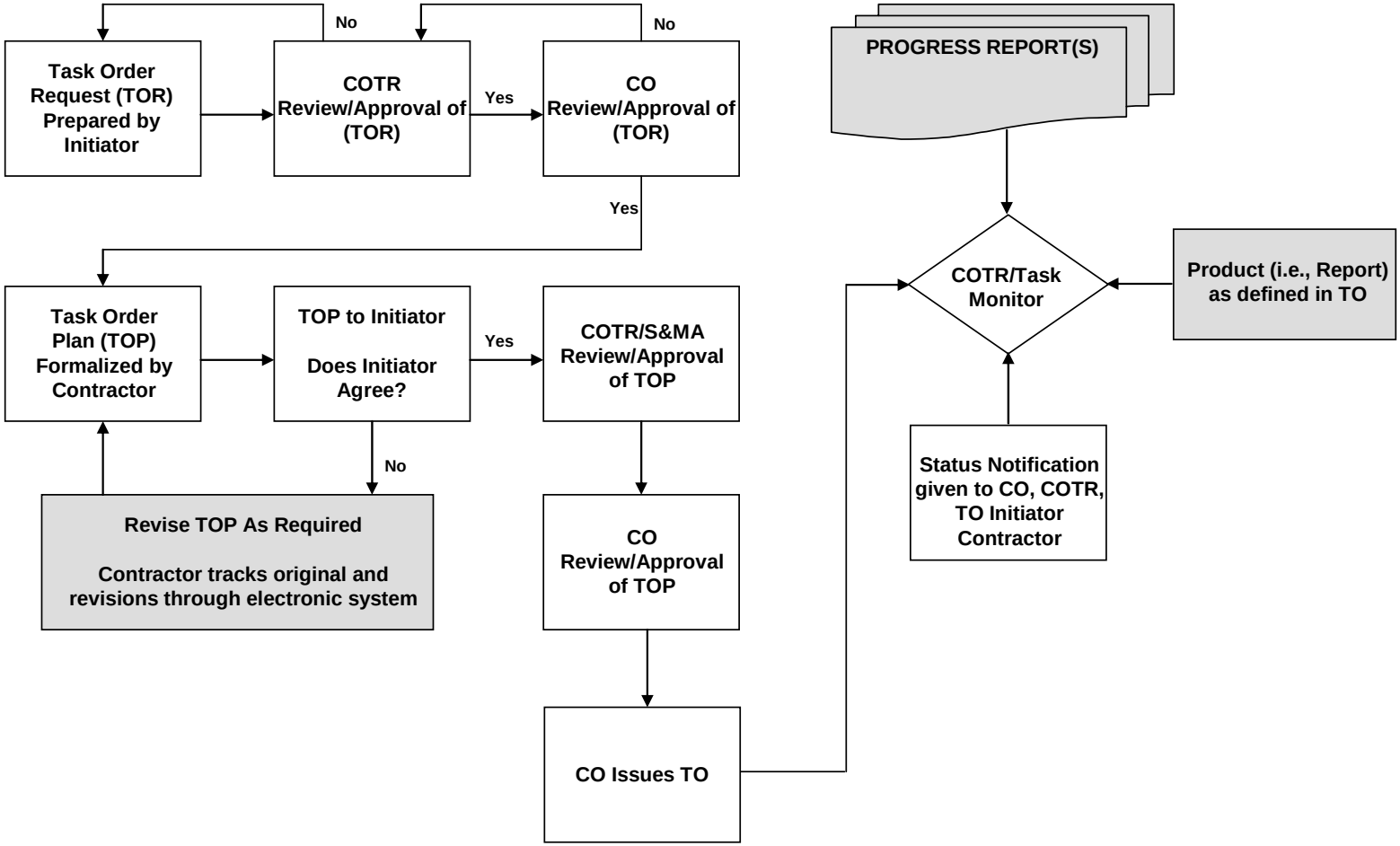
3.8 Reserved

3.9 Environmental Gas Laboratory Support

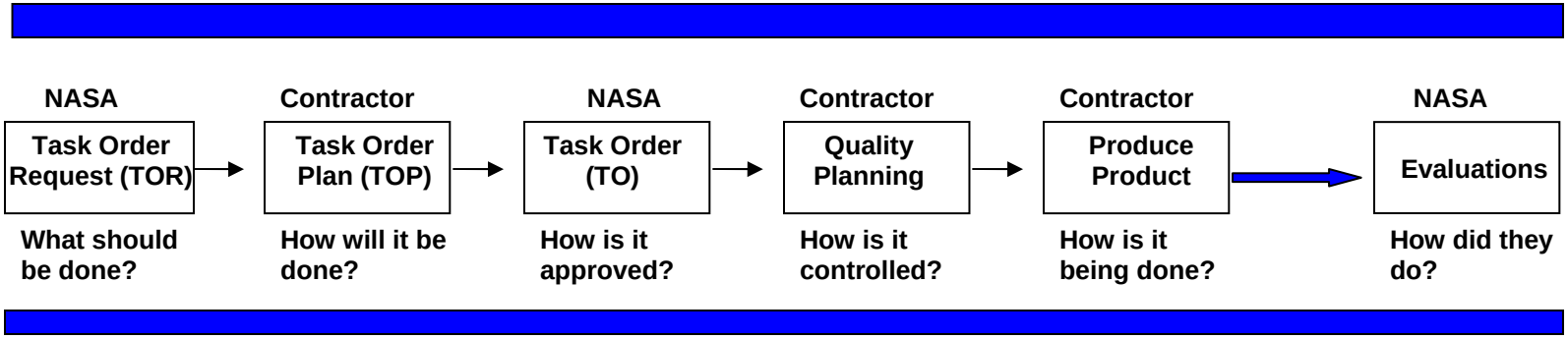
3.10 Computer-Aided Design Drawing

3.11 Data Analysis and Database Entry for Material and Processes Technical Information System (MAPTIS)
3.12 Optics Support
3.13 Tool Crib Operations
3.14 Engineering Technician Support
3.15 Trade Service Support
3.16 Valve and Component Servicing
3.17 Space Systems Integrated Test Facility Support
3.18 Propulsion Test Support
3.19 Support Functions
- 3.19.1 Chemical Analysis
- 3.19.2 Quality Systems Management
- 3.19.3 Planning and Control
- 3.19.4 Contamination Control
- 3.19.5 Engineering
- 3.19.6 Other Support Functions

IDIQ Process



Task Flow Description



- Specific Task Description
- Technical Requirements
- Milestones
- Deliverables
- Evaluation
  - Technical
  - Management
  - Cost

- Technical Skills
- Tools Required
- Schedule
- Cost
  - WYEs
  - Material
  - ODC
- Risk Assessment

- COTR determines TOR is within PWS scope
- TOP is developed
- Initiator agrees/disagrees w/TOP
- COTR approves/ disapproves TOP
- CO approves/ disapproves TOP

- Quality System Management

- Testing
- Analysis
- Fabricating
- Progress Reports
  - Technical
  - Schedule
  - Cost
    - Actual vs Plan

- Award Fee
  - Technical
  - Management
  - Cost
- Evaluations as scheduled
- Evaluations per Surveillance and Evaluation Plans
- Evaluations using Performance Evaluation Board (PEB)
- Contractor provides self-evaluation to PEB

ATTACHMENT J-5

Description of Labor Categories

Service Contract Act Position Descriptions

01010 ACCOUNTING CLERK (Occupational Base)

The Accounting Clerk performs one or more accounting tasks such as; posting to registers and ledgers; balancing and reconciling accounts; verifying the internal consistency, completeness, and mathematical accuracy of accounting documents. In addition, tasks include; assigning prescribed accounting distribution codes; examining and verifying the clerical accuracy of various types of reports, lists, calculations, and postings.

This position is responsible for preparing journal vouchers; making entries of adjustments to accounts; and working with spreadsheets. Level I requires a basic knowledge of routine clerical methods, office practices and procedures as they relate to the clerical processing and recording of transactions. Levels II and III require a knowledge and understanding of the established and standardized bookkeeping and accounting procedures and techniques used in an accounting system, or a segment of an accounting system where there are few variations in the types of transactions handled. In addition, most jobs at each level will require a basic knowledge and understanding of the terminology, codes, and processes used in an automated accounting system.

01011 ACCOUNTING CLERK I

This position is responsible for performing one or more routine accounting clerical operations such as: examining, verifying, and correcting various accounting documents to ensure completeness and accuracy of data in accordance to accounting procedures. Specific tasks/duties are assigned under adequate supervision. Entry-level reconciliation and posting will be assigned under detailed guidance. In most instances, an employee in this position will rely on the supervisors' instructions. Completed work will be reviewed for accuracy and compliance with procedures.

01012 ACCOUNTING CLERK II

This position uses knowledge of double entry bookkeeping in performing one or more of the following: posting actions to journals, identifying subsidiary accounts affected, making debit and credit entries, and assigning proper codes. The Accounting Clerk II may review computer printouts against manually maintained journals, detect and correct erroneous postings, and prepare documents to adjust accounting classifications and other data, or review lists of transactions rejected by an automated system. In this instance, the Accounting Clerk II will determine reasons for rejections, and prepare necessary correcting material. On routine assignments, an employee will select and apply established procedures and techniques. Detailed instructions are provided for difficult or unusual assignments. Completed work and methods used, are reviewed for technical accuracy.

01013 ACCOUNTING CLERK III

The Accounting Clerk III maintains journals or subsidiary ledgers of an accounting system and balances and reconciles accounts. Typical duties include one or both of the following: 1.) reviewing invoices and statements verifying information, ensuring sufficient funds have been obligated, and if questionable, resolving with the submitting unit determining accounts involved. The review will include coding transactions, and processing material through data processing for application in the accounting system; 2.) analysis and reconciliation of computer printouts with operating unit reports (contacting units, researching causes of discrepancies, and taking action to ensure that accounts balance). Supervisor

provides suggestions for handling unusual or non-recurring transactions. Conformance with requirements and technical soundness of completed work are reviewed by the supervisor, or are controlled by mechanisms built into the accounting processes.

01190 ORDER CLERK (Occupational Base)

The Order Clerk receives written or verbal purchase orders. Work typically involves some combination of the following duties: quoting prices, determining availability of ordered items and suggesting substitutes when necessary, advising expected delivery date and method of delivery, recording order and customer information on order sheets. The Order Clerk is responsible for checking order sheets for accuracy and adequacy of information; ascertaining credit rating of customer; furnishing customer with confirmation of receipt of order; order follow up, or informing customer of a delay in delivery. The Order Clerk maintains order files and verifies shipping invoices against original orders.

This position excludes workers paid on a commission basis or whose duties include any of the following: Receiving orders for services rather than for material or merchandise; providing customers with consultative advice using knowledge gained from engineering or extensive technical training; emphasizing selling skills; handling material or merchandise as an integral part of the job.

01191 ORDER CLERK I

This position handles orders involving items that have readily identified uses and applications. The Order Clerk I may refer to a catalog, manufacturer's manual or similar document to insure that the proper item is supplied or to verify the price of order.

01192 ORDER CLERK II

This position handles orders that involve making judgments such as choosing which specific product or material from the establishment's product lines will satisfy the customer's needs, or determining the price to be quoted when pricing involves more than merely referring to a price list or making some simple mathematical calculations.

01270 PRODUCTION CONTROL CLERK

This position compiles and records production data for industrial establishments to compare records and reports on volume of production, consumption of material, quality control, and other aspects of production. May perform any combination of the following duties: compile and record production data from customer orders, work tickets, product specifications, and individual worker production sheets following prescribed recording procedures and using different word processing techniques. This Clerk calculates such factors as types and quantities of items produced, materials used, amount of scrap, frequency of defects, and worker and department production rates, using a computer, calculator, and/or spreadsheets. Additional tasks include: writing production reports based on data compiled, tabulated and computed, following prescribed formats, maintaining files of documents used and prepared, compiling detailed production sheets or work tickets for use by production workers as guides in assembly or manufacture of products. This Clerk prepares written work schedules based on established guidelines and priorities, compiles material inventory records and prepares requisitions for procurement of materials and supplies charts production using chart, graph, or pegboard based on statistics compiled for reference by production and management personnel. This Clerk also sorts and distributes work tickets or material and may compute wages from employee time cards and post wage data on records used for preparation of payroll.

01311 Secretary I
01312 Secretary II
01313 Secretary III

01310 SECRETARY* (Classification Standard)

This position provides principal secretarial support in an office, usually to one individual, and, in some cases, to the subordinate staff of that individual. The Secretary maintains a close and highly responsive relationship to the day-to-day activities of the supervisor and staff, works fairly independently receiving a minimum of detailed supervision and guidance, and performs various clerical and secretarial duties requiring knowledge of office routine and an understanding of the organization, programs, and procedures related to the work of the office. Computers may exist in the environment, requiring working knowledge of certain office software programs.

Classification by Level

Secretary jobs that meet the required characteristics are matched at one of three levels according to two factors: (a) level of the secretary's supervisor within the overall organizational structure, and (b) level of the secretary's responsibility. The table following the explanations of these factors indicates the level of the secretary for each combination of factors.

Level of Secretary's Supervisor (LS)

Secretaries should be matched with one of the three LS levels below that best describes the organization of the secretary's supervisor.

LS-1 Organizational structure is not complex and internal procedures and administrative controls are simple and informal; supervisor directs staff through face-to-face meetings.

LS-2 Organizational structure is complex and is divided into subordinate groups that usually differ from each other as to subject matter, function, etc. Supervisor usually directs staff through intermediate supervisors. Internal procedures and administrative controls are formal. An entire organization (e.g., division, subsidiary, or parent organization) may contain a variety of subordinate groups that meet the LS-2 definition. Therefore, it is not unusual for one LS-2 supervisor to report to another LS-2 supervisor.

The presence of subordinate supervisors does not by itself, mean LS-2 applies. For example, a clerical processing organization divided into several units, each performing very similar work, is placed in LS-1.

In smaller organizations or industries such as retail trades, with relatively few organizational levels, the supervisor may have an impact on the policies and major programs of the entire organization, and may deal with important outside contacts as described in LS-3.

LS-3 Organizational structure is divided into two or more subordinate supervisory levels (of which at least one is a managerial level) with several subdivisions at each level. Executive's program(s) are usually interlocked on a direct and continuing basis with other major organizational segments, requiring constant attention to extensive formal coordination, clearances, and procedural controls. Executive typically has: financial decision-making authority for assigned program(s); considerable impact on the entire organization's financial position or image; and responsibility for, or has staff specialists in such areas as, personnel and administration for assigned organization. Executive plays an important role in determining the policies and major programs of the entire organization, and spends considerable time dealing with outside parties actively interested in assigned program(s) and current or controversial issues.

Level of Secretary's Responsibility (LR)

This factor evaluates the nature of the work relationship between the secretary and the supervisor or staff, and the extent to which the secretary is expected to exercise initiative and judgment. Secretaries should be matched at the level best describing their level of responsibility. When a position's duties span more than one LR level, the introductory paragraph at the beginning of each LR level should be used to determine which of the levels best matches the position. (Typically, secretaries performing at the higher levels of responsibility also perform duties described at the lower levels.)

- LR-1 Carries out recurring office procedures independently, and selects the guideline or reference that fits the specific case. The supervisor provides specific instructions on new assignments and checks completed work for accuracy. The LR-1 performs varied duties including or comparable to the following:

    a. Respond to routine telephone requests that have standard answers; refer calls and visitors to appropriate staff. Control mail and assure timely staff response, and send form letters;
    b. As instructed, maintain supervisor's calendar, make appointments, and arrange for meeting rooms:
    c. Review materials prepared for supervisor's approval for typographical accuracy and proper format;
    d. Maintain recurring internal reports, such as time and leave records, office equipment listings, correspondence controls, and training plans;
    e. Requisition supplies, printing, maintenance or other services, type, take and transcribe dictation, create and maintain office files.

- LR-2 handles differing situations, problems, and deviations in the work of the office according to the supervisor's general instructions, priorities, duties, policies, and program goals. Supervisor may assist secretary with special assignments. Duties include or are comparable to the following:

    a. Screen telephone calls, visitors, and incoming correspondence; personally respond to requests for information concerning office procedures; determine which requests should be handled by the supervisor, appropriate staff member or other offices, prepare and sign routine non-technical correspondence in own or supervisor's name;
    b. Schedule tentative appointments without prior clearance. Make arrangements for conferences and meetings and assemble established background materials as directed. May attend meetings and record and report on the proceedings;
    c. Review outgoing materials and correspondence for internal consistency and conformance with supervisor's procedures; assure that proper clearances have been obtained, when needed;
    d. Collect information from the files or staff for routine inquiries on office program(s) or periodic reports, and refer non-routine requests to supervisor or staff; e. Explain to subordinate staff supervisor's requirements concerning office procedures, coordinate personnel and administrative forms for the office and forwards for processing.

- LR-3 uses greater judgment and initiative to determine the approach or action to take in non-routine situations, interprets and adapts guidelines, including unwritten policies, precedents, and practices, which are not always completely applicable to changing situations. Duties include or are comparable to the following:

    a. Based on knowledge of the supervisor's views, compose correspondence on own initiative about administrative matters and general office policies for supervisor's approval;
    b. Anticipate and prepare materials needed by the supervisor for conferences, correspondence, appointments, meetings, telephone calls, etc., and informs supervisor on matters to be considered;

c. Read publications, regulations, and directives and take action or refer those that are important to the supervisor and staff;
d. Prepare special or one-time reports, summaries, or replies to inquiries, selecting relevant information from a variety of sources such as reports, documents, correspondence, other offices, etc., under general directions;
e. Advise secretaries in subordinate offices on new procedures; request information needed from the subordinate office(s) for periodic or special conferences, reports, inquiries, etc., and shifts clerical staff to accommodate workload needs.

***Excludes* secretaries performing any of the following duties:**

Acting as office manager for the executive's organization, e.g., determines when new procedures are needed for changing situations and devises and implements alternatives; revising or clarifying procedures to eliminate conflict or duplication; identifying and resolving various problems that affect the orderly flow of work in transactions with parties outside the organization.

Preparing agenda for conferences; explain discussion topics to participants; drafts introductions and develops background information and prepares outlines for executive or staff member(s) to use in writing speeches.

The LR-3 advises individuals outside the organization on the executive's views on major policies or current issues facing the organization; contacts or responds to contact from high-ranking outside officials (e.g., city or state officials, members of congress, presidents of national unions or large national or international firms, etc.) in unique situations. These officials may be relatively inaccessible, and each contact typically must be handled differently, using judgment and discretion.

CRITERIA FOR MATCHING SECRETARIES BY LEVEL
Secretary I (01311), Secretary II (01312), Secretary III (01313),

Intentionally blank	LR-1	LR-2	LR-3
LS-1	I 01311	II 01312	III 01313
LS-2	I 01311	III 01313	See Note
LS-3	I 01311	See Note	See Note

NOTE: Employees whose duties meet this level of responsibility and supervision may be properly classified under the Administrative Assistant category or the class may need to be conformed.

13058 LIBRARY TECHNICIAN

The Library Technician provides information service such as answering questions regarding card catalogs and assists in the use of bibliographic tools, such as Library of Congress catalog. The incumbent performs routine cataloging of library materials, files cards in catalog drawers according to system used, answers routine inquiries, and refers persons requiring professional assistance to Librarian. This Technician verifies bibliographic information on order requests, works or directs workers in maintenance of stacks or in section of department or division with tasks such as ordering or receiving section of acquisitions department, card preparation activities in catalog department, or limited loan or reserve desk operation of circulation department.

19000 MACHINE TOOL OPERATION AND REPAIR OCCUPATIONS

This category includes occupations concerned with setting up and operating machine tools, and using hand tools to make or repair (shape, fit, finish, assemble) metal parts, tool, gauges, models, patterns, mechanism, and machines.

19010 MACHINE-TOOL OPERATOR (TOOLROOM)

Someone in this position specializes in operating one or more than one type of machine tool (e.g., jig borer, grinding machine, engine lathe, milling machine) to machine metal for use in making or maintaining jigs, fixtures, cutting tools, gauges, or metal dies or molds used in shaping or forming metal or nonmetallic material (e.g., plastic, plaster, rubber, glass). Work typically involves: planning and performing difficult machining operations which require complicated setups or a high degree of accuracy, setting up machine tool or tools (e.g., installing cutting tools and adjusting guides, stops, working tables, and other controls to handle the size of stock to be machined.

The Machine Tool Operator determines proper feeds, speeds, tooling, and operation sequence or selects those prescribed in drawings, blueprints, or layouts). Work also involves using a variety of precision measuring instruments, making necessary adjustments during machining operation to achieve requisite dimensions to very close tolerances. This worker may be required to select proper coolants and cutting and lubricating oils to recognize when tools need dressing, and to dress tools. In general, the work of a Machine-Tool Operator (Tool room) at the skill level called for in this classification, requires extensive knowledge of machine shop and tool room practice usually acquired though considerable on-the-job training and experience.

19040 TOOL AND DIE MAKER

The Tool and Die Maker constructs and repairs jigs, fixtures, cutting tools, gauges, or metal dies or molds used in shaping or forming metal or nonmetallic material (e.g., plastic, plaster, rubber, glass). Work typically involves: planning and laying out work according to models, blueprints, drawings, or other written or oral specifications, understanding the working properties of common metals and alloys, selecting appropriate materials, tools, and processes required to complete task, making necessary shop computations, and setting up and operating various machine tools and related equipment. Work for someone in this position also involves using various Tool and Die Maker's hand tools and precision measuring instrument, working to very close tolerances, heat-treating metal parts and finished tools and dies to achieve required qualities, and fitting and assembling parts to prescribed tolerances and allowances. In general, the Tool and Die Maker's work requires rounded training in machine shop and tool room practice usually acquired through formal apprenticeship or equivalent training and experience.

21000 MATERIALS HANDLING AND PACKING OCCUPATIONS

This category includes occupations concerned with preparing and arranging materials and products in bulk and non-bulk forms for distribution or storage; moving and loading or unloading equipment, materials, and products; operating or tending pipelines pumps and valves to transfer liquids; driving forklifts and related material-handling machinery and equipment; and using scoops, hand trucks, and wheelbarrows to load and move materials.

21040 MATERIAL EXPEDITER

The Material Expediter executes the following: locates and moves materials and parts between work areas of plant to expedite processing of goods, according to pre-determined schedules and priorities, and keeps related record, reviews production schedules inventory reports, and work orders to determine types, quantities, and availability of required material and priorities of customer orders, confers with department supervisors to determine materials overdue and to inform them of location, availability, and condition of materials, locates and moves materials to specified production areas, using cart or hand truck, and records quantity and type of materials distributed and on hand. Work may include the following tasks: directing Power-Truck Operator or Material Handling Laborer to expedite movement of materials between storage and production areas, compare work ticket specifications with material at work stations

to verify appropriateness of material in use, prepare worker production records and timecards, and may update and maintain inventory records, using computer terminal.

21210 TOOLS AND PARTS ATTENDANT (Tool Crib Attendant)

This incumbent receives, stores, and issues hand tools, machine tools, dies, replacement parts, shop supplies and equipment, such as measuring devices, in an industrial establishment. The Tools and Parts Attendant does the following keeps records of tools issued to and returned by workers, searches for lost or misplaced tools, prepares periodic inventory or keeps perpetual inventory and requisitions stock as needed, unpacks and stores new equipment; visually inspects tools or measures with micrometer for wear or defects and reports damaged or worn-out equipment to superiors; may coat tools with grease or other preservative, using a brush or spray gun, and may attach identification tags or engrave identifying information on tools and equipment using electric marking tool.

23010 AEROSPACE STRUCTURAL WELDER

This worker performs fusion welding on aircraft and ground support equipment to a qualified Welding Procedures Specification (WPS), performs structural fusion welding on aerospace parts and components per the requirements of specifications as prescribed by Engineering Drawings and Work Orders. The incumbent is required to read and understand engineering drawings and welding symbols, fabricates manufacture-welded parts from engineering drawing with out direct supervision, performs fusion welding and torch brazing for ground support equipment, ensuring the procedure is completed per the requirements of the national welding and brazing codes and specifications. This welder welds a wide variety of materials such as aluminum, magnesium, alloyed and low alloy steel, stainless steel and nickel alloy steels. The incumbent is required to have knowledge of the materials to select the correct filler materials and shielding gas when generating the Weld Procedure Specification (WPS), and produce flight critical welds and assist in the development process of generating Weld Procedure Specifications as mandated by welding codes and specifications. The Aerospace Structural Welder determines the sequence of welding in order to prevent or reduce the amount of warp to the weld, designs and fabricates weld holding fixtures as necessary to perform individual welding projects, performs pre-heat and post weld stress relief operations, maintains weld records. The incumbent may perform duties as a Qualified Weld Inspector by inspecting own welds and those of less qualified welders, and may perform duties such as training and re-certification in the various welding processes.

23180 ELECTRONICS TECHNICIAN, MAINTENANCE (Occupational Base)

The Electronics Technician, Maintenance maintains, repairs, troubleshoots, modifies and installs various types of electronic equipment and related devices such as electronic transmitting and receiving equipment (e.g., radar, radio, television, telecommunication, sonar, and navigational aids); personal and main frame computers and terminals, industrial, medical, measuring, and controlling equipment; and industrial robotic devices. The successful incumbent applies technical knowledge of electronics principles in determining equipment malfunctions, and applies skill in restoring equipment operation, evaluates performance and reliability of prototype or production mode, and recommends changes in circuitry or installation specifications to simplify assembly and maintenance.

23182 ELECTRONICS TECHNICIAN, MAINTENANCE II

The Electronics Technician Maintenance II applies basic and some advanced technical knowledge to solve routine problems by interpreting manufacturer’s manuals or similar documents. Work requires familiarity with the interrelationships of circuits and judgment in planning work sequence, in selecting tools, testing instruments, and is reviewed for compliance with accepted practices. This technician works under immediate supervision and achieves technical guidance, as required, from supervisor or higher-level technician.

23530 MACHINERY MAINTENANCE MECHANIC

The Machinery Maintenance Mechanic repairs machinery or mechanical equipment. Work involves most of the following: examining machines and mechanical equipment to diagnose source of trouble, dismantling or partly dismantling machines and performing repairs that mainly involve the use of hand tools in scraping and fitting parts. Responsibilities include replacing broken or defective parts with items obtained from stock, and ordering the production of a replacement part by a machine shop or sending the machine to a machine shop for major repairs. Duties also include preparing written specifications for major repairs or for the production of parts ordered from machine shops, reassembling machines and making all necessary adjustments for operation. In general, the work of a Machinery Maintenance Mechanic requires rounded training and experience usually acquired through a formal apprenticeship or equivalent training and experience.
Excluded from this classification are workers whose primary duties involve setting up or adjusting machines.

23550 MACHINIST, MAINTENANCE

The Machinist, Maintenance produces replacement parts and new parts in making repairs of metal parts of mechanical equipment. Work involves most of the following: interpreting written instructions and specifications, planning and laying out of work, using a variety of machinist's hand tools and precision measuring instruments, setting up and operating standard machine tools. This incumbent is responsible for the shaping of metal parts to close tolerances, making standard shop computations relating to dimensions of work, tooling, feeds, and speeds of machining; knowledge of the working properties of the common metals, selecting standard materials, parts, and equipment required for this work; and fitting and assembling parts into mechanical equipment. In general, the machinist's work normally requires a rounded training in machine-shop practice, usually acquired through a formal apprenticeship or equivalent training and experience.

23580 MAINTENANCE TRADES HELPER

The Maintenance Trades Helper assists one or more workers in the skilled maintenance trades by performing specific or general duties of lesser skill such as: keeping a worker supplied with materials and tools, cleaning working area, machine, and equipment; assisting journeyman by holding materials or tools; and performing other unskilled tasks as directed by journeyman. The kind of work the helper is permitted to perform varies from trade to trade. In some trades the helper is confined to supplying, lifting, and holding materials and tools, and cleaning working areas and in others, the worker is permitted to perform specialized machine operations, or parts of a trade that are also performed by workers on a full-time basis.

23590 METROLOGY TECHNICIAN (Occupational Base)

This category includes occupations responsible for the calibration and certifying of electronic and physical/dimensional measuring and test equipment to technical specifications, maintaining traceability to the National Institute of Standards and Technology (NIST).

23591 METROLOGY TECHNICIAN I

The Metrology Technician I will do most or all of the following: calibrate and certify electronic and physical/dimensional measuring and test equipment to technical data specifications, maintaining traceability to the NIST, US Department of Commerce or by reference to natural constants. This person will utilize calibration methods and techniques based on principles of measurement science, technical analysis of measurement problems, accuracy and precision requirements, troubleshoot, align, and repair malfunctioning measuring and test equipment using theories of operation, block diagrams, schematics, logic trees, and software diagnostics. This worker inspects measuring and test equipment for preventive

maintenance, cleanliness, and safety requirements, and will document results of measurements and calibrations on calibration certificates.

23592 METROLOGY TECHNICIAN II

The Metrology Technician II independently determines and performs operations required to calibrate and certify electronic and physical/dimensional measuring and test equipment, maintaining traceability to the National Institute of Standards and Technology (NIST), US Department of Commerce, or by reference to natural constants. The incumbent will utilize calibration methods and techniques based on principles of measurement science, technical analysis of measurement problems, and accuracy and precision requirements.
The Metrology Technician II identifies magnitude of error sources contributing to uncertainty of results to determine reliability of measurement process in quantitative terms, diagnoses and repairs malfunction in complex measuring and test equipment using theories of operation, block diagrams, schematics, logic trees, and software diagnostics to the component level. This worker provides training to apprentice technicians on metrology principle, resolving technical problems, and complicated electronic theory. This worker will inspect measuring and test equipment for preventive maintenance, cleanliness, and safety requirements, analyze and interpret results of measurements and calibrations using mathematical formulas, and document results of measurements and calibrations on calibration certificates and calibration correction charts.

23593 METROLOGY TECHNICIAN III

The Metrology Technician III will independently determine and perform operations required to calibrate and certify electronic and physical/dimensional measuring and test equipment, maintaining traceability to the National Institute of Standards and Technology (NIST), US Department of Commerce, or by reference to natural constants. This Worker assess and utilize calibration methods and techniques based on principles of measurement science, technical analysis of measurement problems, and accuracy and precision requirements, analyzes magnitude of error sources contributing to uncertainty of results and/or test accuracy ratios to determine reliability of measurement process in quantitative terms. The Incumbent will recommend substitution of standards or measuring equipment if required, diagnose and repair malfunctions in complex measuring and test equipment using theories of operation, block diagrams, schematics, logic trees, and software diagnostics to the component level.

The Metrology Technician III will provide training to apprentice and journeyman technicians on metrology principle, resolving technical problems, and complicated electronic theory, implement quality control plan, identify nonconformities, analyze and interpret trends; recommend corrective actions, investigate and identify root causes of problems.

The Metrology Technician III interprets engineering drawings, schematic diagrams, or formulas to determine quality and reliability standards, inspects measuring and test equipment for preventive maintenance, cleanliness, and safety requirements, analyzes and interprets results of measurements and calibrations using mathematical formulas and authenticate calibration certificates for measurements and calibrations and calibration correction charts.

23760 PAINTER, MAINTENANCE
The Painter, Maintenance paints and redecorates walls, woodwork and fixtures. Work involves the following: knowledge of surface peculiarities and types of paint required for different applications, preparing surface for painting by removing old finish or by placing putty or filler in nail holes and interstices, and applying paint with spray gun or brush. This person may mix colors, oils, white lead and other paint ingredients to obtain proper color or consistency. In general, the work of the maintenance painter requires rounded training and experience usually acquired through a formal apprenticeship or equivalent training and experience.

23890 SHEET-METAL WORKER

The Sheet-Metal Worker, Maintenance fabricates, installs and maintains in good repair the sheet-metal equipment and fixtures (such as machine guards, grease pans, shelves, lockers, tanks, ventilators, chutes, ducts, metal roofing) of an establishment. Work involves most of the following: planning and laying out all types of sheet-metal maintenance work from blueprints, models, or other specifications, setting up and operating all available types of sheet-metal working machines, using a variety of hand tools in cutting, bending, forming, shaping, fitting and assembling, and installing sheet-metal articles as required. In general, the work of the maintenance sheet-metal worker requires rounded training and experience usually acquired through a formal apprenticeship or equivalent training and experience.

23960 WELDER, COMBINATION, MAINTENANCE
[Also see 23010 AEROSPACE STRUCTURAL WELDER (above)]

This incumbent welds metal components together to fabricate or repair products, such as machine parts, plant equipment, mobile homes, motors and generators, according to layouts, blueprints or work orders, using brazing and a variety of arc and gas welding equipment. This worker welds metal parts together, using both gas welding or brazing and any combination of arc welding processes, performs related tasks such as thermal cutting and grinding, repairs broken or cracked parts, fills holes and increases size of metal parts, positions and clamps together components of fabricated metal products preparatory to welding. This worker may locate and repair cracks in industrial engine cylinder heads, using inspection equipment and gas torch, may perform repairs only and be required to pass employer performance tests or standard tests to meet certification standards of governmental agencies or professional and technical associations.

Note: Employees welding aircraft and ground support equipment should be classified as an Aerospace Structural Welder.

30060 DRAFTER/CAD OPERATOR (Occupational Base)

The Draft/CAD Operator performs drafting work manually or using a computer, requiring knowledge and skill in drafting methods, procedures, and techniques, prepares drawings of structures, facilities, land profiles, water systems, mechanical and electrical equipment, pipelines, duck systems, and similar equipment, systems, and assemblies. Drawings are used to communicate engineering ideas, design, and information. This operator uses recognized systems of symbols, legends, shadings, and lines having specific meanings in drawings.

Excluded are:

a. Designers using technical knowledge and judgment to conceive, plan, or modify designs;
b. Illustrators or graphic artists using artistic ability to prepare illustrations;
c. Office drafters preparing charts, diagrams, and room arrangements to depict statistical and administrative data;
d. Cartographers preparing maps and charts primarily using a technical knowledge of cartography;
e. Positions below level I; workers in these trainee positions either trace or copy finished drawings under close supervision or, receive instruction in the elementary methods and techniques of drafting; and
f. Supervisors.

Positions are classified into levels based on the following definitions.

30063 DRAFTER/CAD OPERATOR III

This operator prepares complete sets of complex drawings or computer models that include multiple views, detail drawings, and assembly drawings. Drawings or models include complex design features that require considerable drafting skill to visualize and portray. Assignments regularly require the use of mathematical formulas to draw land contours or to compute weights, center of gravity, load capacities, dimensions, quantities of material, etc. The Draft/CAD Operator works from sketches, computer models, and verbal information supplied by an engineer, architect, or designer to determine the most appropriate views, detail drawings, and supplementary information needed to complete assignments. This operator selects required information from computer programs, and internet sites, precedents, manufacturers' catalogs, and technical guides. This operator independently resolves most of the problems encountered. Supervisor or design originator may suggest methods of approach or provide advice on unusually difficult problems. Typical assignments include:

a. Prepares complete sets of drawings of test equipment to be manufactured from layouts, models, or sketches. Several cross-sectional and subassembly drawings are required. From information supplied by the design originator and from technical handbooks and manuals, this operator describes dimensions, tolerances, fits, fabrication techniques, and standard parts to use in manufacturing the equipment.
b. From electronic schematics, information as to maximum size, and manuals giving dimensions of standard parts, determines the arrangement and prepares drawing of printed circuit boards.
c. From precedents, drafting standards, and established practices, prepares final construction drawings for floodgates, navigation locks, dams, bridges, culverts, levees, channel excavations, dikes and berms, prepares boring profiles, typical cross-sections, and land profiles; and delineates related topographical details as required.
d. Prepares final drawings for street paving and widening or for water and sewer lines having complex trunk lines; reduces field notes and calculates true grades. From engineering designs, lays out plan, profile and detail appur- tenances required; and notifies supervisor of conflicting details in design.

Excludes drafter performing work of similar difficulty to that described at this level but who provides support for a variety of organizations that have widely differing functions or requirements.

30064 DRAFTER/CAD OPERATOR IV

This operator works closely with design originators, preparing drawings or computer models of unusual, complex, or original designs that require a high degree of precision, performs unusually difficult assignments requiring considerable initiative, resourcefulness, and drafting expertise. This incumbent assures that anticipated problems in manufacture, assembly, installation, and operation are resolved by the drawing produced, exercises independent judgment in selecting and interpreting data based on knowledge of the design intent. Although working primarily as a drafter, this worker may occasionally interpret general designs prepared by others to complete minor details, may provide advice and guidance to lower level drafters or serve as coordinator and planner for large and complex drafting projects.

30080 ENGINEERING TECHNICIAN (Occupational Base)

To be covered by these definitions, employees must meet all of the following criteria: Be able to provide semi-professional technical support for engineers working in such areas as research, design, development, testing, or manufacturing process improvement. Work pertains to electrical, electronic, or mechanical components or equipment. These technicians are required to have some practical knowledge of science or engineering. Some positions may require a practical knowledge of mathematics or computer science. Included are workers who prepare design drawings and assist with the design, evaluation, and/or modification of machinery and equipment.

Excluded are:

a. Production and maintenance workers, including workers engaged in calibrating, repairing, or maintaining electronic equipment (see Maintenance Electronics Technicians);
b. Model Makers and other craft workers;
c. Quality Control Technicians and Testers;
d. Chemical and other non-engineering laboratory technicians;
e. Civil Engineering Technicians and Drafters;
f. Positions (below Level I) which are limited to simple tasks such as: measuring items or regular shapes with a caliper and computing cross-sectional areas; identifying, weighing, and marking easy-to-identify items; or recording simple instrument readings at specified intervals; and engineers required to apply a professional knowledge of engineering theory and principles.

30081 ENGINEERING TECHNICIAN I

This technician performs simple routine tasks under close supervision or from detailed procedures. Work is checked in progress or on completion. This person performs one or a combination of such typical duties as:

a. Assembling or installing equipment or parts requiring simple wiring, soldering, or connecting.
b. Performing simple or routine tasks or tests such as tensile or hardness tests; operating and adjusting simple test equipment; records test data.
c. Gathering and maintaining specified records of engineering data such as tests, drawings, etc.; performing computations by substituting numbers in specified formulas; plotting data and draws simple curves and graphs.

30082 ENGINEERING TECHNICIAN II

The Engineering Technician II performs standardized or prescribed assignments involving a sequence of related operations, follows standard work methods on recurring assignments but receives explicit instructions on unfamiliar assignments. Technical adequacy of routine work is reviewed on completion; non-routine work may be reviewed in progress. This technician performs at this level, one or a combination of such typical duties as:

a. Following specific instructions, assembles or constructs simple or standard equipment or parts, servicing or repairing simple instruments or equipment;
b. Conducting a variety of tests using established methods, preparing test specimens, adjusting and operating equipment, recording test data, and pointing out deviations resulting from equipment malfunction or observational errors;
c. Extracting engineering data from various prescribed but non-standardized sources, processing the data following well-defined methods including elementary algebra and geometry, and presenting the data in prescribed form.

30083 ENGINEERING TECHNICIAN III

The Engineering Technician III performs assignments that are not completely standardized or prescribed, selects or adapts standard procedures or equipment, using fully applicable precedents, receives initial instructions, equipment requirements, and advice from supervisor or engineer as needed, performs recurring work independently. Work is reviewed for technical adequacy or conformity with instructions. This technician performs at this level one or a combination of such typical duties as:

a. Constructing components, subunits, or simple models or adapts standard equipment; may troubleshoot and correct malfunctions;

b. Following specific layout and scientific diagrams to construct and package simple devices and subunits of equipment.
c. Conducting various tests or experiments which may require minor modifications in test setups or procedures as well as subjective judgments in measurement, selecting, preparing, and operating standard test equipment and records test data;
d. Extracting and compiling a variety of engineering data from field notes, manuals, lab reports, etc., processing data, identifying errors or inconsistencies, selecting methods of data presentation.
e. Assisting in design modification by compiling data related to design, specifications, and materials that are pertinent to specific items of equipment or component parts; developing information concerning previous operational failures and modifications, and using judgment and initiative to recognize inconsistencies or gaps in data and seek sources to clarify information.

30084 ENGINEERING TECHNICIAN IV

The Engineering Technician IV performs non-routine assignments of substantial variety and complexity, using operational precedents that are not fully applicable, such assignments that are typically parts of broader assignments, are screened to eliminate unusual design problems. This incumbent may plan such assignments. This technician receives technical advice from supervisor or engineer. Work is reviewed for technical adequacy (or conformity with instructions). This position may be assisted by lower level technicians and have frequent contact with professionals and others within the establishment, and performs one or a combination of such typical duties as:

a. Developing or reviewing designs by extracting and analyzing a variety of engineering data, applying conventional engineering practices to develop, prepare, or recommend schematics, designs, specifications, electrical drawings and parts lists. (Examples of designs include: detailed circuit diagrams; hardware fittings or test equipment involving a variety of mechanisms; conventional piping systems; and building site layouts).
b. Conducting tests or experiments requiring selection and adaptation or modification of a wide variety of critical test equipment and test procedures, preparing and operating equipment, recording data, measuring and recording problems of significant complexity that sometimes require resolution at a higher level, and analyzes data and prepares test reports.
c. Applying methods outlined by others to limited segments of research and development projects, constructing experimental or prototype models to meet engineering requirements; conducts tests or experiments and redesigns as necessary and recording and evaluating data and reports findings.

30085 ENGINEERING TECHNICIAN V

This technician performs non-routine and complex assignments involving responsibility for planning and conducting a complete project of relatively limited scope or a portion of a larger and more diverse project, selects and adapts plans, techniques, designs, or layouts, contacts personnel in related activities to resolve problems and coordinate the work, reviews, analyzes, and integrates the technical work of others. Supervisor or professional engineer outlines objectives, requirements, and design approaches. Completed work is reviewed for technical adequacy and satisfaction of requirements. This incumbent may train and be assisted by lower level technicians, and performs one or a combination of the following:

a. Designs, develops, and constructs major units, devices, or equipment; conducts tests or experiments; analyzes results and redesigns or modifies equipment to improve performance; and reports results.
b. From general guidelines and specifications (e.g., size or weight requirements), develops designs for equipment without critical performance requirements that are difficult to satisfy such as engine parts, research instruments, or special purpose circuitry. Analyzes technical data to determine applicability to design problems; selects from several possible design

layouts; calculates design data; and prepares layouts, detailed specifications, parts lists, estimates, procedures, etc. May check and analyze drawings or equipment to determine adequacy of drawings and design.

c. Plans or assists in planning tests to evaluate equipment performance. Determines test requirements, equipment modification, and test procedures; conducts tests using all types of instruments; analyzes and evaluates test results, and prepares reports on findings and recommendations.

30210 LABORATORY TECHNICIAN (Laboratory Tester)

The Laboratory Technician (Laboratory Tester) performs laboratory tests according to prescribed standards to determine chemical and physical characteristics or composition of solid, liquid, or gaseous materials and substances for purposes such as quality control, process control, product development, or determining conformity to specifications. This incumbent sets up and adjusts laboratory apparatus, and operates grinders, agitators, centrifuges, ovens, condensers, and vibrating screens to prepare material for testing according to established laboratory procedure. This worker performs physical tests on samples of cement or raw materials and controls quality of materials and mix during manufacturing process.

Work involves running tests of the following: raw materials, such as aggregate, limestone, and sand, for such qualities as permeability, load-bearing capacity, or cohesiveness; dry and liquid substances used as ingredients in adhesives, propellants, lubricants, refractories, synthetic rubber, paint, paper, and other compounds for purity, viscosity, density, absorption or burning rate, melting point, or flash point, using viscometer, torsion balance scale, and pH meter; solutions used in processes, such as anodizing, waterproofing, cleaning, bleaching, and pickling, for chemical strength, specific gravity, or other specifications; materials for presence and content of elements or substances, such as hydrocarbons, manganese, natural grease or impurities, tungsten, sulfur, cyanide, ash or dust, and samples of manufactured products, such as cellophane or glassware, to verify conformity with heat resistance, tensile strength, ductibility, and other specifications, and examines materials, using microscope.

The Laboratory Technician (Laboratory Tester) records test results on standard forms, writes test reports describing procedures used, and prepares graphs and charts, cleans and sterilizes laboratory apparatus, may prepare chemical solutions according to standard formulae, and may add chemicals or raw materials to process solutions or product batches to correct deviations from specifications.

30460 TECHNICAL WRITER (Occupational Base)

Under general supervision, the Technical Writer writes and edits technical reports, brochures, and/or manuals for internal documentation, customer reference, or publication. This person researches and analyzes available literature and verifies copy with appropriate departments, and may coordinate production and distribution of materials.

30462 TECHNICAL WRITER II

In this capacity, the Technical Writer revises or writes material that is mostly standardized for reports, manuals, briefs, proposals, instruction books, catalogs, and related technical and administrative publications concerned with work methods and procedures, and installation, operation, and maintenance of machinery and other equipment. The incumbent receives assignment and technical information from a supervisor or senior writer, may be provided notes or manuals containing operating procedures and details, and may observe production, developmental or experimental activities to expand or verify the provided operating procedures and details.

This worker accesses manufacturers' catalogs, drawings and other data relative to operation, maintenance, and service of equipment, may have access to blueprints, sketches, drawings, parts lists,

specifications, mockups, and product samples to integrate and delineate technology, operating procedure, and production sequence and detail. This writer organizes material and completes writing assignment according to set standards regarding order, clarity, conciseness, style, and terminology, may maintain records and files of work and revisions, may select photographs, drawings, sketches, diagrams, and charts to illustrate material, assist in laying out material for publication, and arrange for typing, duplication and distribution of material. This writer may draft speeches, articles, and public or employee relations releases, or specialize in writing material regarding work methods and procedures.

99610 QUALITY CONTROL INSPECTOR
(FGE is one grade above the class that performs the work being inspected.)

This inspector implements quality control and safety plans to ensure compliance with contract specifications and applicable regulations, inspects all phases of a variety of goods, services or operation for conformity to established quality, health and safety, and other operational standards by performing on-going work for compliance with contractual provisions; ensures all services listed on the performance requirement summary are performed in a satisfactory manner, specifies areas to be inspected (scheduled and unscheduled) and how often inspections will be accomplished, communicates deficiencies to proper persons, maintains Quality Control files, and document results of all inspections.

METAL-CLEANER, IMMERSION

Tends equipment that chemically cleans grease, scale, dirt, and other foreign matter from metal objects to prepare them for processes, such as electroplating and galvanizing: Removes shavings, dirt, and rust spots from objects, using air-hose, file, or sandpaper. Loads objects on conveyor which carries them through series of chemical and rinsing baths, or places objects on racks or in containers and immerses objects in chemical and rinsing solutions, manually or using hoist. Moves controls to start conveyor and to regulate temperature of solution or conveyor speed. Maintains consistency of cleaning solutions by adding specified amount of chemical to solutions. Drains, cleans, and refills tanks with chemicals. May dry objects, using dryer. May examine cleaned objects to ensure conformance to standards.

CNC PROGRAMMER

Computer control programmers and operators use computer numerically controlled (CNC) machines to cut and shape precision products, such as automobile parts, machine parts, and compressors. CNC machines include machining tools such as lathes, multiaxis spindles, milling machines, laser cutting, water jet cutting, and wire electrical discharge machines (EDM), but the functions formerly performed by human operators are performed by a computer-control module. CNC machines cut away material from a solid block of metal, plastic, or glass—known as a workpiece—to form a finished part. Computer control programmers and operators normally produce large quantities of one part, although they may produce small batches or one-of-a-kind items. They use their knowledge of the working properties of metals and their skill with CNC programming to design and carry out the operations needed to make machined products that meet precise specifications.

CNC programmers turn the planned machining operations into a set of instructions. These instructions are translated into a computer aided/automated manufacturing (CAM) program containing a set of commands for the machine to follow. These commands normally are a series of numbers (hence, numerical control) that describes where cuts should occur, what type of cut should be used, and the speed of the cut. CNC programmers and operators check new programs to ensure that the machinery will function properly and that the output will meet specifications. Because a problem with the program could damage costly machinery and cutting tools or simply waste valuable time and materials, computer simulations may be used to check the program instead of a trial run. If errors are found, the program must be changed and retested until the problem is resolved. In addition, growing connectivity between CAD/CAM software and CNC machine tools is raising productivity by automatically translating designs

into instructions for the computer controller on the machine tool. These new CAM technologies enable programs to be easily modified for use on other jobs with similar specifications.

After the programming work is completed, CNC operators—also referred to as computer-controlled machine tool operators, metal and plastic—perform the necessary machining operations. The CNC operators transfer the commands from the server to the CNC control module using a computer network link or floppy disk. Many advanced control modules are conversational, meaning that they ask the operator a series of questions about the nature of the task. CNC operators position the metal stock on the CNC machine tool—spindle, lathe, milling machine, or other—set the controls, and let the computer make the cuts. Heavier objects may be loaded with the assistance of other workers, autoloaders, a crane, or a forklift. During the machining process, computer-control operators constantly check to see if any problems exist. Machine tools have unique characteristics, which can be problematic. During a machining operation, the operator modifies the cutting program to account for any problems encountered. Operators who make these adjustments need a basic knowledge of CNC programming. Unique, modified CNC programs are saved for every different machine that performs a task.

ELECTRONICS MECHANIC

Electrical and electronics development mechanic; prototype assembler, electronics assembles, tests, and modifies prototype or custom electronic parts, systems, and apparatus to develop assembly methods and techniques for use by production workers, applying knowledge of electronic theory and assembly techniques: Reads blueprints, wiring diagrams, process sheets, and assembly and schematic drawings, and receives verbal instructions regarding work assignment. Aligns and assembles parts, such as leads, coils, wires, tabs, and terminals into housing, using hand tools, power tools, soldering iron, brazing fixture, and welding head. Routes and laces cables. Installs components and parts, such as switches, coils, transformers, relays, transistors, and semiconductor circuits on chassis, circuit boards, panels, and other units, using hand tools, power tools, soldering and welding equipment, and thermocompression bonding, mass reflow soldering, or resistance welding techniques. Routes and attaches wires and connectors to form circuitry and connects assembly to power supply sources, switch panels, or junction boxes. Attaches hardware and seals assembly, using rivets, screws, hand tools, power tools, resistance welder or thermocompression bonding. Examines parts for defects, such as pinholes or chips. Replaces defective components and wiring, using hand tools and soldering iron. Calibrates unit according to specifications. Enters information on production records, logs, and other report forms. May assemble prototype microelectronic units, using binocular microscope. May assemble prototype electronics using automatic and semi-automatic fabrication equipment. May repair defective units rejected by inspection or test personnel.

ELECTRONICS WORKER

Electrical and electronics development worker; prototype assembler, electronics assembles, tests, and modifies prototype or custom electronic parts, systems, and apparatus to develop assembly methods and techniques for use by production workers, applying knowledge of electronic theory and assembly techniques: Reads blueprints, wiring diagrams, process sheets, and assembly and schematic drawings, and receives verbal instructions regarding work assignment. Aligns and assembles parts, such as leads, coils, wires, tabs, and terminals into housing, using hand tools, power tools, soldering iron, brazing fixture, and welding head. Routes and laces cables. Installs components and parts, such as switches, coils, transformers, relays, transistors, and semiconductor circuits on chassis, circuit boards, panels, and other units, using hand tools, power tools, soldering and welding equipment, and thermocompression bonding, mass reflow soldering, or resistance welding techniques. Routes and attaches wires and connectors to form circuitry and connects assembly to power supply sources, switch panels, or junction boxes. Attaches hardware and seals assembly, using rivets, screws, hand tools, power tools, resistance welder or thermocompression bonding. Examines parts for defects, such as pinholes or chips. Replaces defective components and wiring, using hand tools and soldering iron. Calibrates unit according to specifications. Enters information on production records, logs, and other report forms. May assemble

prototype microelectronic units, using binocular microscope. May assemble prototype electronics using automatic and semi-automatic fabrication equipment. May repair defective units rejected by inspection or test personnel. **Works under the guidance, directions, instructions, and oversight of the Electronics Mechanics.**

ELECTRONICS PLANNER/LEAD

Reviews and provides manufacturability input to engineering drawings. Develops detailed fabrication planning to implement engineering requirements contained in engineering drawings, standards, and procedures. Detailed planning is typically documented in shop travelers, work orders or detailed test procedures and includes step-by-step instructions for electronics mechanics to fabricate or test prototype electronics. Prioritizes work and resolves in-process problems which may include developing work around instructions for material review board consideration. Develops customer quotes based on historical information, engineering data, and process capability. Maintains status of jobs in-progress. Develops detailed reports which may include actual job hours accrued and issues encountered. Oversees work and provides detailed written and verbal instructions to electronics mechanics on methods and techniques to accomplish jobs. Makes recommendations for process improvements and maintains inventory of consumables and other items necessary to accomplish jobs.

SAFETY/TRAINING SPECIALIST

Develops and implements safety program to prevent or correct unsafe environmental working conditions, utilizing knowledge of industrial processes, mechanics, chemistry, and industrial health and safety laws: Examines plans and specifications for new machinery or equipment to determine if all safety precautions have been included. Tours work areas to inspect fire and safety equipment, machinery, and facilities to identify and correct potential hazards and ensure compliance with safety regulations. Determines requirements for safety clothing and devices, and designs, builds, and installs, or directs installation of safety devices on machinery. Conducts or coordinates safety and first aid training to educate workers about safety policies, laws, and practices. Investigates industrial accidents to minimize recurrence and prepares accident reports.

MANUFACTURING PROCESS PLANNER / ESTIMATOR

Develops detailed fabrication planning to implement engineering requirements contained in engineering drawings, standards, and procedures. Provides detailed manpower and material cost estimates for fabrication and assembly tasks based on design documentation and drawings. Detailed planning is typically documented in shop travelers, work orders or detailed test procedures and includes step-by-step instructions for electronics mechanics to fabricate or test prototype electronics. Prioritizes work and resolves in-process problems which may include developing work around instructions for material review board consideration. Develops customer quotes based on historical information, engineering data, and process capability. Maintains status of jobs in-progress. Develops detailed reports which may include actual job hours accrued and issues encountered. Oversees work and provides detailed written and verbal instructions to electronics mechanics on methods and techniques to accomplish jobs. Makes recommendations for process improvements and maintains inventory of consumables and other items necessary to accomplish jobs.

PRODUCIBILITY

Works with designers, engineers, and manufacturing personnel to determine capability of producing deliverable end items. Reviews design drawings for geometric dimensions and tolerances (GD&T) for item fabrication and assembly. Provides fabrication recommendations to cut tolerance restrictions for most efficient machining processes while maintaining integrity of deliverable end item.

EXEMPT

**OPERATIONS MANAGER

Provides leadership and management to ensure all technical operations of the contract are accomplished to adequately meet the requirements of the Government while ensuring the safety and health of the work force and compliance with all environmental laws, regulations, and NASA/MSFC environmental standards. Individual shall also ensure operations are conducted in a manner that will protect the Government's property from damage. Using lower level technical leads and supervisors, individual accomplishes these goals with a large multi skilled workforce operating in numerous hazardous and non-hazardous work environments. Responsible for ensuring only qualified personnel are utilized in conducting work under this contract and, where applicable, that only individuals with proper certification conduct work that requires certification.

TEST COORDINATOR

This task requires that the employee work closely with customers to ensure that our facilities will surpass their expectations. Ability to communicate complex issues verbally and in writing to others in formal and informal settings and a high degree of organizational skills and demonstrated ability to manage multiple projects. Must work effectively with engineers and scientists from multiple disciplines as well as procurement and resource management personnel. Must be highly proficient with MS Office and Acrobat). Working knowledge of Project Management software is a plus.

Job duties include:

1) Coordinate test requirements, develop estimates, and finalize test data delivery with billing to commercial customers.
2) Coordinate test requirements, develop estimates, and finalize data delivery to MSFC's clientele.
3) Maintain and monitor test schedules to accommodate customers' timeline.
4) Maintain schedules for Environmental, Structural Strength, and Structural Dynamics facilities with primary Test Laboratory management.
5) Assist with promotional elements (website, brochures, posters, presentations, conferences) as needed.

**QUALITY ASSURANCE MANAGER

Manages the quality assurance functions. Is responsible for developing, implementing, and managing the quality system, safety system, and acceptance/inspection of deliverable end items.

**BUSINESS MANAGER

Manages the accounting and administration functions. Maintains cost control and cost reporting and interfaces with the Government and Corporate Office on business and cost issues.

**MANAGER

Principal onsite manager responsible for overall contract compliance, administration, and operation.

CHEMIST

Conducts research, analysis, synthesis, and experimentation on substances, for such purposes as product and process development and application, quantitative and qualitative analysis, and improvement of analytical methodologies: Devises new equipment, and develops formulas, processes,

and methods for solution of technical problems. Analyzes organic and inorganic compounds to determine chemical and physical properties, utilizing such techniques as chromatography, spectroscopy, and spectrophotometry. Induces changes in composition of substances by introduction of heat, light, energy, and chemical catalysts. Conducts research on manufactured products to develop and improve products. Conducts research into composition, structure, properties, relationships, and reactions of matter. Confers with scientists and engineers regarding research, and prepares technical papers and reports. Prepares standards and specifications for processes, facilities, products, and tests.

ENGINEER

Researches, plans, and designs chemical, mechanical and electromechanical products and systems, and directs and coordinates activities involved in fabrication, operation, application, installation, and repair of chemical, mechanical or electromechanical products and systems: Researches and analyzes data, such as customer design proposal, specifications, and manuals to determine feasibility of design or application. Designs products or systems, such as instruments, controls, robots, engines, machines, and mechanical, thermal, hydraulic, or heat transfer systems, applying knowledge of engineering principles. Plans and directs engineering personnel in fabrication of test control apparatus and equipment, and development of methods and procedures for testing products or systems. Directs and coordinates fabrication and installation activities to ensure products and systems conform to engineering design and customer specifications. Coordinates operation, maintenance, and repair activities to obtain optimum utilization of machines and equipment. May design products and systems to interface machines, hardware, and software. May evaluate field installations and recommend design modifications to eliminate machine or system malfunctions. Directs activities of scientists, other engineers and test technicians and advises management on engineering problems: Apportions work among engineering staff according to specialized training.

PHYSICIST

Conducts research into phases of physical phenomena, develops theories and laws on basis of observation and experiments, and devises methods to apply laws and theories of physics to industry, medicine, and other fields: Performs experiments with masers, lasers, telescopes, mass spectrometers, electron microscopes, and other equipment to observe structure and properties of matter, transformation and propagation of energy, relationships between matter and energy, and other physical phenomena. Describes and expresses observations and conclusions in mathematical terms. Devises procedures for physical testing of materials. Conducts instrumental analyses to determine physical properties of materials.

DATA ANALYST

Reviews test data for reasonableness of data provided for database entry. Reviews input data for accuracy and consistency with historical data. Reviews computer input and output documents to ensure accuracy, completeness, and adherence to establishment standards: Reviews documents to ensure completeness and appropriateness prior to data entry. Reads notes and instructions written on source documents and compares information with printouts to detect errors and ensure completeness and conformity with establishment policies and procedures. Notifies supervisor when errors and shortage of output are detected, and corrects errors or refers work to other workers for correction. Compares corrected input and output data with source documents, worksheets, and data displayed on screen of computer terminal to verify corrections.

**** Labor Categories covered under PWS 1.0 are excluded from Attachment J-6, “IDIQ Fully Burdened Labor Categories”**

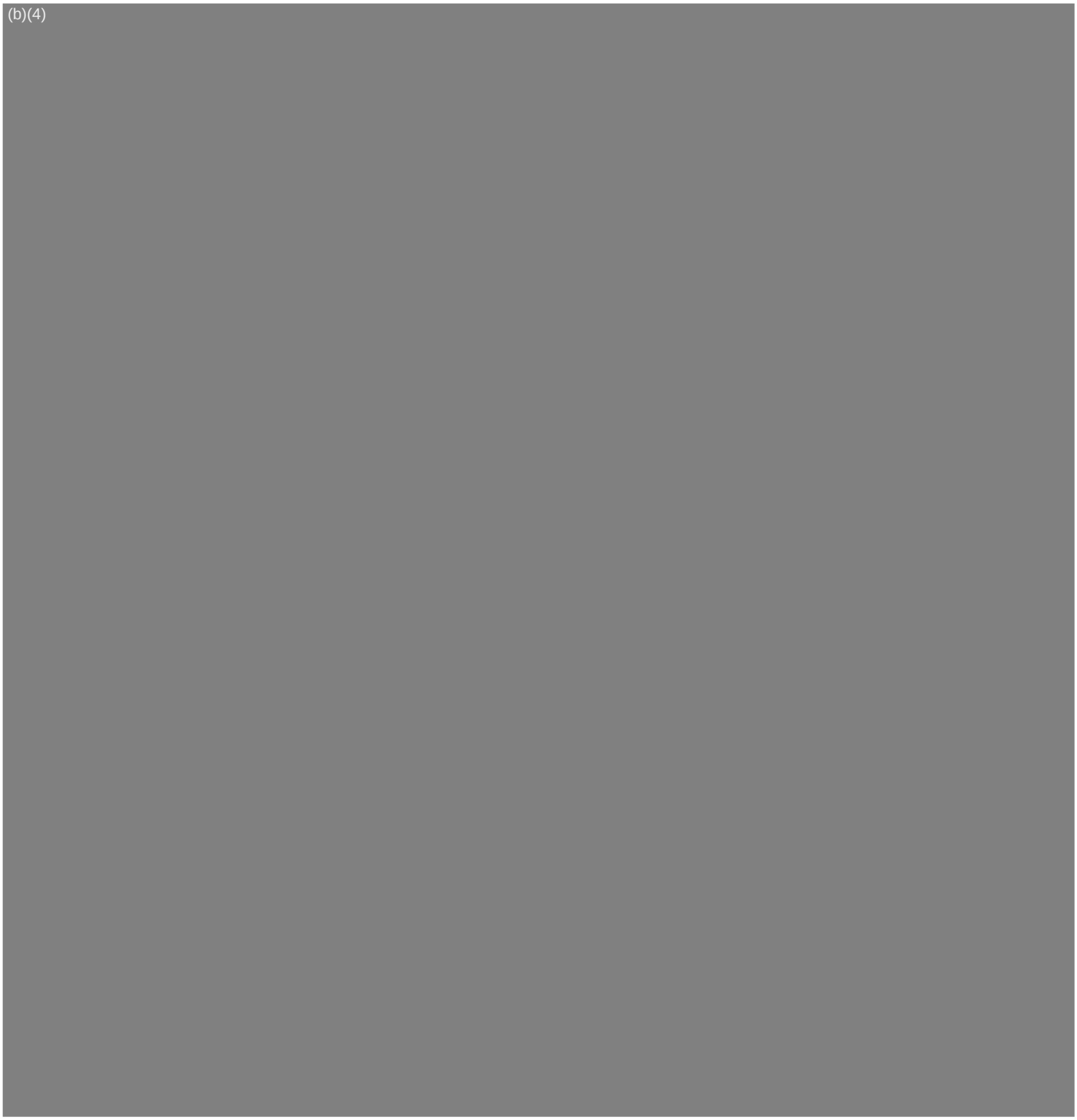
ATTACHMENT J-6

SCHEDULE OF IDIQ FULLY BURDENED (EXCEPT FEE) NOT-TO-EXCEED (NTE)

LABOR RATES FOR PRIME & MAJOR SUBCONTRACTORS

In accordance with Clause H.5, Supplemental Task Order Procedures, the Contractor shall not exceed the hourly labor rates specified in the table below when developing price estimates for all task orders contemplated or issued under this contract. These labor rates shall be inclusive of indirects and exclusive of fee. The estimated cost for resulting task orders will be negotiated individually, based upon the below schedule of fully burdened rates, as work is authorized (reference Clause H.5, paragraph c). Award fee for the individual task orders will not exceed the rates specified below. The G&A ceiling rate specified in Clause B.7 shall not be exceeded in computing a fully burdened labor rate in all task orders. Detailed Labor Category Position Descriptions are defined in Attachment J-5.

Fully Burdened NTE Hourly Labor Rates for Prime Contractor


(b)(4)

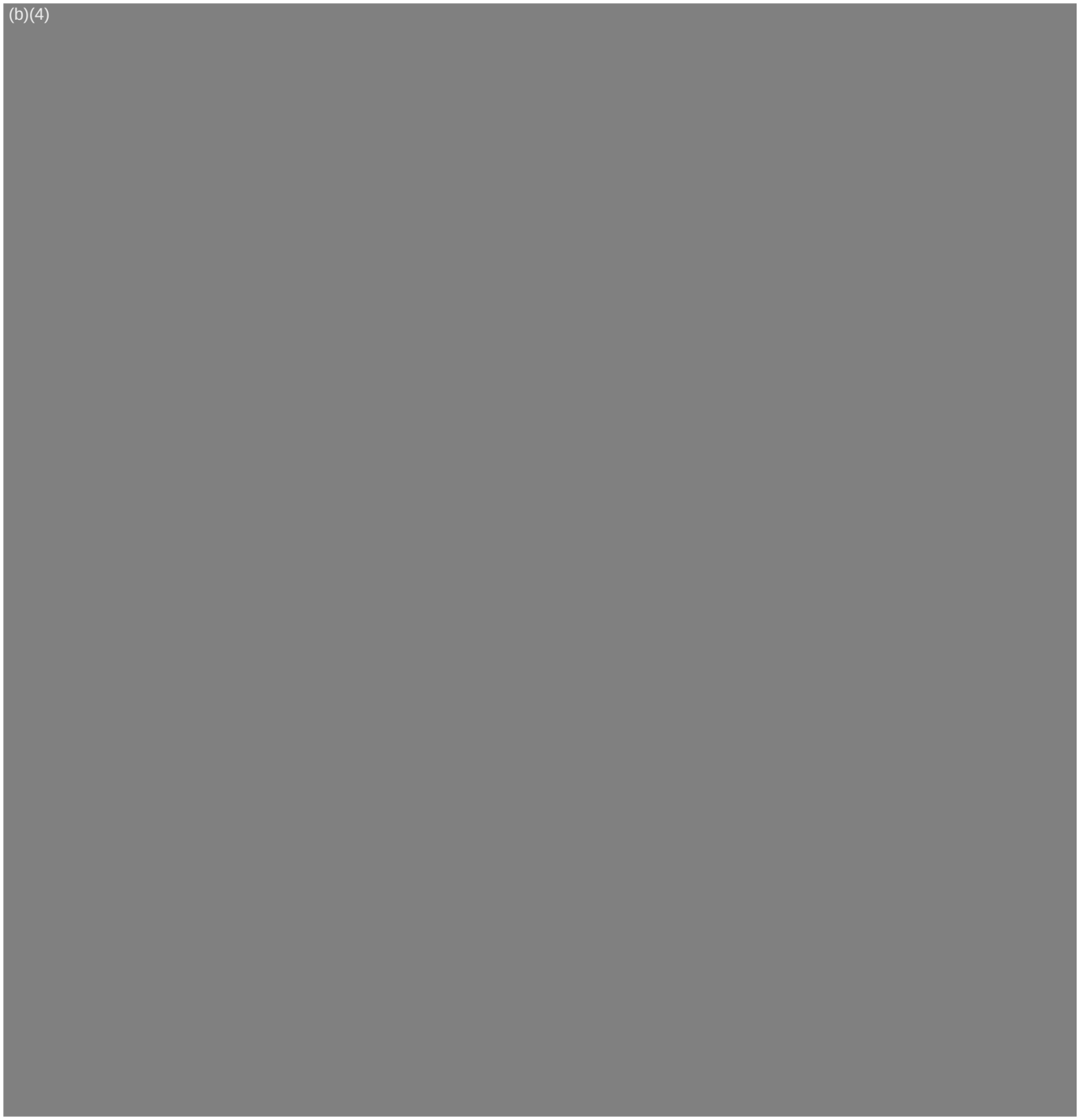
Material Handling and Prime Award Fee Rates (For All Task Orders)

The Contractor shall not exceed the material handling rate specified below nor the G&A ceiling rate specified in Clause B.7 for pricing all other direct costs (supplies, materials, equipment, travel, training) in all task orders contemplated or issued under this contract. In addition, the contractor shall not exceed the award fee rate specified below in calculating the maximum available award fee for all task orders issued under this contract. General operating supplies, materials, tools, equipment, travel, and training shall be non-fee bearing in pricing all task orders contemplated or issued under this contract.

In accordance with Clause H.5, Supplemental Task Order Procedures, the contractor shall not exceed the hourly labor rates specified in table(s) below for pricing all task orders contemplated or issued under this contract that include Teammates and/or Major Subcontractor labor. These rates should be inclusive of fee (if applicable) for each Teammate and/or Major Subcontractor as proposed by the Offeror and any applicable prime contractor burdens (exclusive of fee). In adding the applicable prime contractor burden, the G&A ceiling rate specified in Clause B.7 shall not be exceeded in computing a fully burdened labor rate in all task orders.

Fully Burdened NTE Labor Rates ($/Hr) for Teammate/Major Subcontractor

(b)(4)


(b)(4)

ATTACHMENT J-7

TASK ORDERS BY REFERENCE

Task Order No.	Initiating Org	Description	Period of Performance	Estimated Cost	Maximum Potential Award Fee	Total Value

ATTACHMENT J-8

APPLICABLE REGULATIONS AND PROCEDURES

The documents listed herein contain specifications to which performance of the contract requirements and work described in the Performance Work Statement (Attachment J-1) and Data Procurement Document (Attachment J-2) shall conform. The contractor shall comply with all the requirements of these documents and all revisions thereto. Current versions shall be utilized, unless authorization to use obsolete versions has been properly documented. This listing is not intended to relieve the Contractor of its responsibility for identification of applicable regulations and procedures and compliance therewith when performing work onsite at MSFC.

For the Contractor's information, NASA recognizes a document hierarchy. NASA Policy Directives (NPDs) and NASA Procedural Requirements (NPRs) are headquarters' level documents and take precedence over center level documents. The center equivalent to these documents is Marshall Policy Directives (MPDs), and Marshall Procedural Requirements (MPRs) that are written to support the headquarters documents at the local level. The hierarchical order for these documents is NPD, and NPR at the HQ level and MPD, and MPR at the center level. Beyond the documents, the center also has Marshall Work Instructions (MWIs) that typically support implementation of one of the higher level documents and Organizational Instructions (OIs) that provide work direction for activities that do not affect the entire center.

Notwithstanding the hierarchy of NASA's documentation system, in terms of understanding the requirements for performing this contract, the Contractor's attention is invited to the documents specifically referenced in the PWS, the WBS Unique Procedures in this attachment, and documents referenced in the Data Requirements Documents.

As a Services Contract provider, the contractor shall utilize all NASA and MSFC Directives and Standards as applicable, as well as Organizational Instruction(s) (OIs).

NASA Directives can be found at the following URL: http://nodis3.gsfc.nasa.gov/
MSFC Directives can be found at the following URL: https://repository.msfc.nasa.gov/directives
NASA and MSFC Standards can be found at the following URL: http://standards.nasa.gov

OMB CIRCULARS

Circular A-130	Management of Federal Resources

NASA DOCUMENTATION

1371.2	NPR	Procedural Requirements for Processing Requests for Access to NASA Installation or Facilities by Foreign Nationals or U.S. Citizens Who are Reps. of Foreign Entities w/Change 1 (3/29/04)
1490.1	NPD	NASA Printing, Duplicating, and Copying Management
1600.1	NPR	NASA Security Program Procedural Requirements (Note: NPR 1600.1 replaced NPR 1620.1.)
1620.3	NPR	Physical Security Requirements for NASA Facilities/Property

1800.2	NPD	NASA Occupational Health Program
1810.2	NPD	NASA Occupational Medicine Program
1820.1	NPD	NASA Environmental Health Program
1840.1	NPR	Management of Workers Compensation Injuries and Illnesses
2810.1	NPR	Security of Information Technology
4100.1	NPR	NASA Materials Inventory Management Manual
4200.1	NPR	NASA Equipment Management Manual
5100.4	NPR	Federal Acquisition Regulation Supplement, (NASA/FAR Supplement) Part 18-45 and latest revisions thereto
7120.5	NPR	NASA Program and Project Management Processes and Requirement
7123.1	NPR	System Engineering Procedural Requirements
7150.2	NPR	NASA Software Engineering Process
8000.4	NPR	Risk Management Procedural Requirements
8621.1	NPR	NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping NPD 8710.2, NASA Safety and Health Program Policy
8621.1	NPR	NASA Procedural Requirements for Mishap Reporting, Investigating, and Recordkeeping
8700.1	NPD	NASA Policy for Safety and Mission Success
8705.6	NPR	NASA Procedural Requirements for Safety and Mission Assurance Reviews and Assessments
8710.5	NPD	NASA Safety Policy for Pressure Vessels and Pressurized systems
8715.1	NPR	NASA Occupational Safety and Health Programs w/Change 3 (02/13/06)
8715.2	NPR	NASA Emergency Preparedness Plan Procedural Requirements – Revalidated
8715.3	NPR	NASA Safety Manual
9501.2	NPR	NASA Contractor Financial Management Reporting

MSFC DOCUMENTATION (MWIs, MPDs, and MPRs)

1040.3	MPD	MSFC Emergency Program
1040.3	MPR	MSFC Emergency Plan
1280.1	MGM	Guidance for Continual Improvement
1280.1	MPD	Marshall Management Manual
1280.3	MWI	Corrective/Preventive Action Notification System
1280.4	MPD	MSFC Corrective Action System
1280.5	MWI	MSFC ALERT Processing
1371.1	MPR	Procedural Requirements for Processing Foreign Visitor requests
1440.2	MPR	MSFC Records Management Program
1600.1	MPR	MSFC Security Procedural Requirements
1700.1	MPR	MSFC Industrial Safety Procedures and Guidelines
1700.3	MWI	NASA Safety Reporting System Corrective Action Process (NSRS)
1800.1	MPR	Bloodborne Pathogens
1800.1	MPD	MSFC Smoking Policy
1810.1	MPR	MSFC Occupational Medicine
1840.1	MPR	MSFC Confined Space Entries
1840.1	MPD	MSFC Environmental Health Program
1840.2	MPR	MSFC Hazard Communication Program
1840.2	MPD	MSFC Hearing Conservation Program
1840.3	MPR	MSFC Hazardous Chemicals in Laboratories Protection Program
1840.3	MPD	MSFC Respiratory Protection Program
1860.1	MPD	Laser Safety
1860.1	MPR	MSFC Radiation Safety Procedural Requirements
1860.2	MPD	Radiation Safety Program
2190.1	MPD	MSFC Export Control Program

2210.1	MPD	Documentation Input and Output of the MSFC Documentation Repository
2210.1	MWI	MSFC Documentation Repository Input/Output and Data Management Project Requests
2500.1	MPR	Marshall Telecommunications and Audio Visual Services
2800.1	MPD	Management of Information Technology Systems and Services at MSFC
2800.1	MWI	Service Order System for Information Technology (IT)
2800.2	MPR	Marshall Information Technology (IT) Services
2800.4	MPR	Marshall Operational Readiness Review (MORR) for Center Applications and Web Sites
2810.1	MPD	Security of Information Technology
2810.1	MPR	Security of Information Technology
2810.2	MPD	Cleaning Information from Computer Equipment at MSFC
3410.1	MPR	Training
3410.1	MWI	Personnel Certification Program
3810.1	MPR	MSFC Management of Workers Compensation Injuries
4000.2	MPR	Property Management
4200.1	MWI	Equipment Control
4220.1	MWI	Space Utilization, Communications, Furniture, Relocation, and Special Event Services
4300.1	MWI	Disposal Turn-Ins/Reutilization Screening
4500.1	MWI	Program Stock, Storage, and Retail Store Operations
4520.1	MWI	Handling (Receiving), Shipping, Delivery, and Packaging Procedures
4520.2	MWI	Use of the Procurement Discrepancy Tracking System (PDTS)
5116.1	MWI	Evaluation of Contractor Performance under Contracts with Award Fee Provisions
6700.1	MPR	Motor Vehicle and Motor Pool Operations

7120.2	MWI	Data Requirements Identification and Traceability
7120.2	MPR	Multi-Program/Project Common use Documentation
7120.3	MPR	Data Management Programs/Projects
7120.4	MWI	Documentation Preparation Programs/Projects
7120.4	MPR	MSFC Program Management Council (PMC) Process
7120.6	MWI	Program Project Continuous Risk Management
8040.1	MPR	Configuration Management Programs/Projects
8040.2	MPR	Product Identification and Traceability
8040.5	MWI	Floor Engineering Orders and Floor Engineering Parts List
8060.1	MPR	Flight Systems Design/Development Control
8060.3	MPR	Requirements and Design Reviews, MSFC Programs and Projects
8500.1	MPR	MSFC Environmental Management Program
8500.1	MPD	MSFC Environmental Management Policy
8500.1	MPR	MSFC Environmental Management Program
8500.2	MPR	MSFC Environmental Management System Manual
8540.2	MWI	Affirmative Procurement Program for Environmentally Preferable Products
8550.1	MWI	Waste Management
8550.2	MWI	Storm Water Management
8550.3	MWI	Wastewater Compliance
8550.4	MWI	Air Emissions Compliance
8550.5	MWI	Chemical Management
8621.1	MWI	Close Call and Mishap Reporting and Investigation Program
8715.1	MPR	Marshal Safety, Health, and Environmental (SHE) Program
8715.1	MWI	Electrical Safety Program

8715.10	MWI	Explosives, Propellants, & Pyrotechnics Program
8715.11	MWI	Fire Safety Program
8715.13	MWI	Safety Concerns Reporting System (SCRS)
8715.15	MWI	Ground Operations Safety Assessment and Risk Mitigation Program
8715.16	MWI	Supervisor's Safety Visits
8715.2	MWI	Lockout/Tagout Program
8715.3	MWI	Hazard Identification and Warning System
8715.4	MWI	Personal Protective Equipment (PPE)
8715.9	MWI	Occupational Safety Requirements for Contractors
8720.1	MPD	MSFC Reliability and Maintainability Program for Space Systems
8900.1	MPD	Medical Operations Responsibilities for Human Space Flight Programs

NASA Standards

8719.11	NASA-STD	Safety Standard for Fire Protection

MSFC Standards Handbooks, Manuals and Reports

555	MSFC-STD	MSFC Engineering Documentation Standard
1951	MSFC-MNL	Change processing, Tracking, and Accounting System User's Guide
2806	MSFC-STD	MSFC Tailoring Guide for the Global Drawing Requirements Manual
3173	MSFC-HDBK	Multi-Program/Project Common Use Project Management/System Engineer Handbook
3394	MSFC-STD	Standard for Contractor Configuration Management Requirements, MSFC Programs/Projects

Miscellaneous Documents

1845	NFS	Government Property
29 CFR 1910		Department of Labor; Occupational Safety and Health Standards
26 CFR 1925		Safety and Health Standards for Federal Service Contracts

29 CFR 1926	Department of Labor; Occupational Safety and Health Administration Standards for Construction Industry
29 CFR 1960	Basic Program Elements for Federal Employee Occupational Safety and Health Programs
40 CFR	Protection of the Environment
48 CFR Chapter 1	Federal Acquisition Regulations
48 CFR Chapter 18	NASA FAR Supplement
ASME Y 14.100	Engineering Drawing Practices
ASME Y 14.35M	Revision of Engineering Drawings and Associated Documentation
ASME Y 14.5M	Dimensioning and Tolerancing
ASME Y 14.5.2	Certification of Dimensioning and Tolerancing Professionals
Executive Order 13101	Greening the Government through Waste Prevention, Recycling, and Federal Acquisition
FAR	Federal Acquisition Regulation, Part 45
FED-STD-313 D	Material Safety Data, Transportation Data, and Disposal Data for Hazardous
FIPS PUB 201	Federal Information Processing Standards Publication No. 201
HSPD-12	Homeland Security Presidential Directorate
NFPA STANDARDS	National Electrical Code and National Fire Code
SSP 30223	International Space Station Program Problem Reporting and Corrective Action System Requirements
No Reference Number	IEC/DDMS User Guide Release 2.0 dated February 3, 2006

MISCELLANEOUS POLICIES AND PROCEDURES

MSFC Smoking Policy at http://www.msfc.nasa.gov/msfccwa/personel/smoke.html

WBS UNIQUE PROCEDURES

I. WBS 2.1 Materials Testing

Promoted Ignition-Combustion Testing

1. NASA-STD-6001
2. EM10-OWI-CHM-037

3. EM10-OWI-CHM-050
4. EM10-OWI-CHM-051
5. EM10-OWI-CHM-057
6. EM10-OWI-CHM-058
7. EM10-OWI-CHM-061
8. EM10-OWI-CHM-064

Flammability Testing

1. NASA-STD-6001
2. EM10-OWI-CHM-034
3. EM10-OWI-CHM-036
4. EM10-OWI-CHM-050
5. EM10-OWI-CHM-051
6. EM10-OWI-CHM-058

Liquid and Gaseous Oxygen Mechanical Impact Testing

1. NASA-STD-6001
2. EM10-OWI-CHM-032
3. EM10-OWI-CHM-033
4. EM10-OWI-CHM-050
5. EM10-OWI-CHM-051
6. EM10-OWI-CHM-057
7. EM10-OWI-CHM-058
8. EM10-OWI-CHM-061

Advanced Materials Ignition Testing

1. NASA-STD-6001
2. ASTM G72
3. ASTM D2863
4. EM10-OWI-CHM-038
5. EM10-OWI-CHM-045
6. EM10-OWI-CHM-050
7. EM10-OWI-CHM-051
8. EM10-OWI-CHM-058
9. EM10-OWI-CHM-059
10. EM10-OWI-CHM-060
11. EM10-OWI-CHM-061
12. EM10-OWI-CHM-062
13. EM10-OWI-CHM-063
14. EM10-OWI-CHM-082
15. EM10-OWI-CHM-083
16. EM10-OWI-CHM-089

Thermal Vacuum Stability (Outgassing) Testing

1. ASTM-E-595
2. JSC-SP-R-0022
3. EM10-OWI-CHM-040
4. EM10-OWI-CHM-050
5. EM10-OWI-CHM-051
6. EM10-OWI-CHM-058

Toxic Offgassing (Toxicity) Testing

1. NASA-STD-6001
2. EM10-OWI-CHM-039
3. EM10-OWI-CHM-050
4. EM10-OWI-CHM-051
5. EM10-OWI-CHM-058

Test Sample Verification and Preparation

1. NASA-STD-6001
2. EM10-OWI-CHM-042
3. EM10-OWI-CHM-050
4. EM10-OWI-CHM-051

II. WBS 2.2 ETF/EFDTF Test Support

ET01-OWI-001	Control of Organizational Issuances and Records
ET01-PRO-OWI-002	Test Operation Procedure Preparation and Change Control
ET01-PRO-OWI-003	Test Preparation Sheet Instructions
ET24-CM-PLAN-200	Environmental Test Facility Configuration Management Plan
ET24-Crane-SOP-001	Overhead Crane Operations Safety Requirements Documents
ET24-CR-SOP-001	ETF Standard Operating Procedure Clean Room System
ET24-ETF-OWI-001	Organizational Work Instruction for ETF Test Operations
ET24-ForkLift-SOP-001	Power Industrial Fork Truck Operation Safety Requirements
ET24-LEAK-SOP-001	SOP for Alcatel ASM 181 T2 Leak Detector
ET24-LEAK-SOP-002	SOP for VEECO MS40 Leak Detector
ET24-LEAK-SOP-003	SOP for VEECO MS40 Leak Detector with Ext. Roughing
ET24-LN2-FOP-001	FOP for the ETF Liquid Nitrogen System
ET24-LOTO-SOP-001	Control of Hazardous Energy Procedure for the ETF
ET24-ManLift-SOP-001	Vehicle Mounted Work Platform Operations Safety
	Requirements
ET24-PressCal-SOP-001	SOP for Application of Pressure Gauge Calibration Data
ET24-RGA-SOP-001	SOP for the Residual Gas Analyzer Systems
ET24-ScanCal-SOP-001	SOP for In-house Calibration of Data Acquisition Systems
ET24-Software-SOP-001	SOP for Data Acquisition Software Verification
ET24-Sunspot-FOP-001	FOP for Sunspot Thermal Vacuum Chamber
ET24-TA1-FOP-001	FOP for Thermal Altitude Chamber TA1
ET24-TH1-FOP-001	FOP for Thermal Humidity Chamber TH1
ET24-TH2-FOP-001	FOP for Thermal Humidity Chamber TH2
ET24-TH3-FOP-001	FOP for Thermal Humidity Chamber TH3
ET24-TH4-FOP-001	FOP for Thermal Humidity Chamber TH4
ET24-TH5-FOP-001	FOP for Thermal Humidity Chamber TH5
ET24-TH6-FOP-001	FOP for Thermal Humidity Chamber TH6
ET24-TH7-FOP-001	FOP for Thermal Humidity Chamber TH7
ET24-TH8-FOP-001	FOP for Thermal Humidity Chamber TH8
ET24-TH9-FOP-001	FOP for Thermal Humidity Chamber TH9
ET24-TQCM-SOP-001	SOP for Temperature-Controlled Quartz Crystal
	Microbalance (TQCM) Systems
ET24-UnattnOps-SOP-001	Unattended Operation of the ETF
ET24-V11-FOP-002	FOP for Rapid Depressurization Testing in Thermal
	Vacuum Chamber V11

ET24-V14-FOP-001	FOP for V14 Thermal Vacuum Chamber
ET24-V20-FOP-001	FOP for Thermal Vacuum Chamber V20
ET24-V2-FOP-001	FOP for V2 Thermal Vacuum Chamber
ET24-V3-FOP-001	FOP for V3 Thermal Vacuum Chamber
ET24-V4-FOP-001	FOP for Thermal Vacuum Chamber V4
ET24-V5-FOP-001	FOP for V5 Thermal Vacuum Chamber
ET24-V6-FOP-001	FOP for V6 Thermal Vacuum Chamber
ET24-V7-FOP-001	FOP for Thermal Vacuum Chamber V7
ET24-V8-FOP-001	FOP for Thermal Vacuum Chamber V8
ET24-V9-FOP-001	FOP for Thermal Vacuum Chamber V9
ET24-Variac-FOP-001	SOP for a Variac
ET24-V12-FOP-001	FOP for Thermal Vacuum Chamber V12
ET12-OWI-100	Experimental Test Project Process
ET12-OWI-101	SOP for Non-Critical Lifts
ET12-ARF-FOP-001	Aerodynamic Research Facility Operating Procedure
ET12-FOP-CWT-001	Facility Operating Procedure for Calibrating Wind Tunnel
ET12-PTE-FOP-001	Pump Test Equipment Facility Operating Procedure
ET12-RAF-FOP-001	Rocket Motor Air Flow Facility Operating Procedure
ET12-NT-FOP-001	Nozzle Test Facility Operating Procedure
ET12-IT-FOP-001	Inducer Test Facility Operating Procedure
ET12-TT-FOP-001	Turbine Test Facility Operating Procedure
TD74-ITL-001	Inducer Test Loop Operational Instructions
TD74-NTF-001	Nozzle Test Facility Standard Operating Procedures
TD74-NTF-002	Nozzle Test Facility Pre-heat System Operational Instructions
TD74-NTF-003	Nozzle Test Facility Regenerative Heat System Operational Instructions
TD74-TTE-001	Turbine Test Equipment SOP
TD74-FOP-CWT	Calibrating Wind Tunnel FOP
TD74-100	Organizational Instructions

III. WBS 2.3 Structural Test Support

ET21-SGC-SOP-300	General Operating Procedures For The Gilmore Tensile Test Machine
ET21-JJ-SOP-310	General Operating Procedures For The 260k SATEC Universal Test Machine
ET21-RAL-SOP-320	General Operating Procedures For The 120k SATEC Universal Test Machine
ET21-SGC-SOP-400	MTS Aero-90 Load Control System General Operating Procedures
ET21-MAW-SOP-410	General Load-Line Component Specifications And Assembly Procedures
ET21-KML-SOP-420	General Hydraulic Power Unit Operating Procedures
ET21-NWT-SOP-430	General Hydraulic Procedures
ET21-CEW-SOP-100	Structural Loads Test Measurement Acquisition System (SLTMAS) User's Manual
ET21-SLR-SOP-110	SLTMAS Conversion Equations
ET21-CLH-SOP-130	Strain Gauge Installation And Removal Procedures
ET21-GL-SOP-140	Calibration Procedures For EDC Model 501j
ET21-RAL-SOP-150	Electrical/Electronic Displacement Transducer Calibration

	Procedure
ET21-RAL-SOP-160	Electrical/Electronic Displacement Indicator Installation Procedures
ET21-GL-SOP-170	General Operating Procedures For The HYTORC Electric-Hydraulic Torque Machine
ET21-CEW-OWI-800	Measuring And Test Equipment Calibration Process
ET21-NWT-OWI-900	Work Process Instruction
ET20-OWI-001	Test Program And Documentation Control
ET20-OWI-002	Test Procedure Preparation And Change Control
ED27-OWI-005	Non-Critical Lifts
ET01-DYN-FOP-601	TEAC Data Recorder Calibration
ET01-DYN-FOP-602	TEAC Data Recorder High Sample Rate Calibration
ET23-ACU-FOP-001	B&K Type 2133 Frequency Analyzer Calibration
ET23-ACU-FOP-003	Acoustic Tests
ET23-ACU-FOP-005	Acoustic Emission Measurements
ET23-ACU-FOP-007	Annual Calibration of Microphones
ET23-ACU-FOP-008	Acoustic Data Acquisition
ET23-ACU-FOP-011	B&K Pulse System Calibration
ET23-CDL-FOP-001	Use of Ometron Laser Vibrometer for Dynamic Testing
ET23-CDL-FOP-002	Calibration of Ometron Laser Vibrometer for Dynamic Testing
ET23-CDL-FOP-003	HP3566/PC Data Acquisition for Dynamic Tests
ET23-CDL-FOP-004	Calibration of Laser Doppler Displacement Sensors for Dynamic Testing
ET23-EMA-FOP-002	PCB Multi-Channel Accelerometer System Setup and Calibration for Modal Surveys
ET23-EMA-FOP-003	MIMO Modal Surveys Using LMS CADA-X Software
ET23-EMA-FOP-005	Bungee Suspension for Modal Surveys
ET23-EMA-FOP-008	Cabling Schematics for Data Acquisition with Hewlett Packard 3565 Measurement Hardware for Modal Surveys
ET23-EMA-FOP-009	Calibration of PCB333 Accelerometer for Modal Testing
ET23-EMA-FOP-010	Verification of LMS Scadas/POA and Agilent VXI Data Acquisition System
ET23-EMA-FOP-012	Load Cell Calibration for Modal Surveys
ET23-EMA-FOP-013	ICP Accelerometer Calibration for Modal Surveys
ET23-EMA-FOP- 014	Cabling Schematics for Data Acquisition with LMS Scadas III Measurement Hardware for Modal Surveys
ET23-EMA-FOP-015	Cabling Schematics for the NT Workstation Computer with HP E14214B VXI Measurement Hardware for Modal Surveys
ET23-EMA-FOP-016	Argon Laser Operation
ET23-EMA-FOP-017	Nicolet Compass Net 8-Channel Data Acquisition System Operation, Calibration, and Verification
ET23-EMA-FOP-018	DC Capacitive Accelerometer Calibration for Modal Surveys
ET23-EMA-FOP-019	Impact Modal Surveys Using LMS Test, Lab Software
ET23-EMA-FOP-021	Throughput Acquisition Using LMS CADA –X-Software
ET23-EMA-SOP-002	Laser Operations in the Optical Modal Testing Facility
ET23-OWI-001	Documentation Control
ET23-OWI-002	Non-Critical Lifts
ET23-SHK-FOP-001	Pyrotechnic Shock Tests
ET23-SHK-FOP-002	Calibration Of Accelerometers Used In Shock Tests
ET23-SHK-FOP-003	Nicolet BE256LE Calibration and Software Verification

ET23-SHK-FOP-004	SRSFAMOS and FAMOS Software Verification
ET23-SHK-SOP-001	Pyrotechnic Shock Facility
ET23-VIB-FOP-001	Vibration East Control System Calibration and Software Verification
ET23-VIB-FOP-003	Vibration and Shock Testing
ET23-VIB-FOP-004	Vibration Test
ET23-VIB-FOP-006	Vibration West Control System Calibration and Software Verification
ET23-VIB-FOP-010	Calibration of Accelerometers in Vibration East
ET23-VIB-FOP-014	Stud Tensioning

IV. WBS 2.4 Fabrication and Assembly of R&D Space Flight and Associated Hardware

NPR 4100.1	NASA Materials Inventory Management Manual
MPR 1280.4	MSFC Corrective Action System
MPR 8730.3	Control of Non-Conforming Product
MPR 8730.5	Control of Inspection, Measuring, and Test Equipment
MWI 1280.1	Fabrication Services Request Instructions (MSFC Form 3751)
MWI 1280.5	MSFC ALERT Processing
MWI 5330.1	Evaluation of Contractors, Suppliers, and Vendors
MWI 8040.5	Floor Engineering Orders and Floor Engineering Parts Lists (FEOs/FEPLs)
MWI 8730.1	Equipment Logs/Records
MWI 8730.2	Temporarily Installed Hardware Control
MWI 8730.3	MSFC Material Review System
EI41-05-001	Mechanical Fabrication Work Instructions
ANSI/AWS-C3.4	Torch Brazing
ANSI/AWS-C3.5	Brazing, Induction
ANSI/AWS-C3.6	Furnace Brazing
ANSI/AWS-C3.7	Aluminum Brazing
ANSI/AWS D1.1	Structural Welding Code ASME B31.3
ASME B31.1	ASME Code for Pressure Piping, B31,
ASTM A967	American National Standard Standard Specification for Chemical Passivation
ASTM-B488	Treatments for Stainless Steel Parts Standard Specification for Electrodeposited
ASTM-B661	Coatings of Gold for Engineering Uses Standard Practice for Heat Treatment of Magnesium Alloys
ASTM-E1444	Standard Practice for Magnetic Particle Examination
ASTM E1742	Standard Practice for Radiographic Examination
IEST-STD-CC1246D	Product Cleanliness Levels and Contamination Control Program
ISO 14644-1	Clean rooms and Associated Controlled Environments
MIL-A-8625	Anodic Coating for Aluminum and Aluminum Alloys
MIL-C-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-DTL-13924	Coating, Oxide, Black, for Ferrous Metals

MIL-DTL-16232	Phosphate Coating, Heavy, Manganese of Zinc Base
MIL-PRF-83282	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, NATO Code Number H-537
MIL-HDBK-6870	Inspection Program Requirements Nondestructive for Aircraft and Missile Materials and Parts MIL-PRF-23377 Primer Coating; Epoxy, High-Solids
MIL-S-5002	Surface Treatments and Inorganic Coatings for Metal Surfaces of Weapon Systems
MIL-DTL-83133	Turbine Fuels, Aviation
MSFC-PROC-166	Procedure for Hydraulic System Detailed Parts, Components, Assemblies, and Hydraulic Fluids for Space Vehicles, Cleaning, Testing, and Handling
MSFC-RQMT-1282	Requirements for Surface Preparation and Application of Dry Film Lubricants
MSFC-SPEC-164	Cleanliness of Components for use in Oxygen, Fuel, and Pneumatic System Specification for
MSFC-SPEC-259	Radiographic Inspection: Soundness Requirements for Fusion Welds in Aluminum and Magnesium Alloy Sheet and Plate Material (Space Vehicle Components) Standard
MSFC-SPEC-445	Adhesive Bonding Process and Inspection
MSFC-SPEC-504	Requirement for Welding Aluminum Alloys
MSFC-SPEC-560	Fusion Welding of Steels, Corrosion, and Heat Resistant Alloys
MSFC-SPEC-766	Fusion Welding Titanium and Titanium Alloys
MSFC-SPEC-2489	Cleaner, Organic
MSFC-SPEC-2490	Cleaner, Organic With D-Limonene
MSFC-SPEC-2491	Cleaner, Aqueous
MSFC-SPEC-2492	Cleaner, Aqueous With D-Limonene
MSFC-STD-2497	Hand Wipe Cleaning Requirements
MSFC-STD-156	Standard for Riveting, Fabrication, and Inspection
MSFC-STD-246	Standard Design and Operational Criteria for Controlled Environmental Areas
MSFC-STD-366	Penetrant Inspection Method
MSFC Standard 486	Standard Threaded Fasteners, Torque Limit
MSFC-STD-561	Threaded Fasteners, Securing of Flight Hardware Used on Shuttle Payloads and Experiments
MSFC-STD-2594	MSFC Fastener Management and Control Practices
NAS 410	NAS Certification and Qualification of Nondestructive Test Personnel
NASA-STD-5006	General Fusion Welding Requirements for Aerospace Materials in Flight Hardware
SAE-AMS-2770	Heat Treatment of Wrought Aluminum Alloy Parts
SAE-AMS-2771	Heat Treatment of Aluminum Alloy Casting
SAE-AMS-2772	Heat Treatment of Aluminum Alloy Raw Materials
SAE-AMS-H-6875	Process for Heat Treatment of Steel
SAE-AMS-H-81200	Heat Treatment of Titanium and Titanium Alloys
SAE-AMS-QQ-N-290	Nickel Plating (Electrodeposited)
SAE-AMS-QQ-P-35	Passivation Treatment for Corrosion-Resistant Steel
SN-C-0005	NSTS Contamination Control Requirements
SNT-TC-IA-SET	Complete Set of ASNT-TC-1A Including All Supplements

TT-C-490	Cleaning Methods for Ferrous Surfaces and Pretreatments for Organic Coatings

V. WBS 2.5 Electrical Fabrication, Test, and Assembly

NASA-STD-8739.1	Workmanship Standard for Staking and Conformal Coating of Printed Wiring Boards and Electronic Assemblies (Superseding NAS-5300.4(3J-1), NHB-5300.4(3L), AND NHB-5300.4(3M))
NASA-STD-8739.2	Workmanship Standard for Surface Mount Technology (Superseding NAS-5300.4(3M))
NASA-STD-8739.3	Soldering Electrical Connections (Superseding NHB-5300.4(3A-2)) (Includes change 2 released 01/18/2001)
NASA-STD-8739.4	Crimping, Interconnecting Cables, Harnesses, and Wiring (Superseding NAS-5300.4(3G-1), NHB-5300.4(3G) AND NHB-5300.4(3H)
NASA-STD-8739.5	Fiber Optic Terminations, Cable Assemblies, and Installation
ANSI/EOS/ESD-S20.20	Development of an Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices).
EI42-EFT-OI-001	Electronic Fabrication & Test Workflow and Control
EI42-EFT-OI-002	Process for Electronic Fabrication and Assembly
ASTM-E1237	Standard Guide for Installing Bonded Resistance Strain Gages
MSFC-SPEC-708	ID Markers for Space Systems Electrical Harness
MSFC-STD-372	Silk Screening of Electrical Equipment
MSFC-STD-373	Lettering of Electrical Equipment
MSFC-STD-383	Standard for Rubber Stamping of Electrical Equipment and Components
IPC-6012	Qualifications and Performance Specifications for Rigid Printed Boards
NPR 4100.1	NASA Materials Inventory Management Manual
MPR 1280.4	MSFC Corrective Action System
MPR 8730.3	Control of Non-Conforming Product
MPR 8730.5	Control of Inspection, Measuring, and Test Equipment
MWI 1280.1	Fabrication Services Request Instructions (MSFC Form 3751)
MWI 1280.5	MSFC ALERT Processing
MWI 5330.1	Evaluation of Contractors, Suppliers, and Vendors
MWI 8040.5	Floor Engineering Orders and Floor Engineering Parts Lists (FEOs/FEPLs)
MWI 8730.1	Equipment Logs/Records
MWI 8730.2	Temporarily Installed Hardware Control
MWI 8730.3	MSFC Material Review System
EI41-05-001	Mechanical Fabrication Work Instructions
ANSI/AWS-C3.4	Torch Brazing
ANSI/AWS-C3.5	Brazing, Induction
ANSI/AWS-C3.6	Furnace Brazing
ANSI/AWS-C3.7	Aluminum Brazing

ANSI/AWS D1.1	Structural Welding Code ASME B31.3
ASME B31.1	ASME Code for Pressure Piping, B31,
ASTM A967	American National Standard Specification for Chemical Passivation
ASTM-B488	Treatments for Stainless Steel Parts Standard Specification for Electrodeposited
ASTM-B661	Coatings of Gold for Engineering Uses Standard Practice for Heat Treatment of Magnesium Alloys
ASTM-E1444	Standard Practice for Magnetic Particle Examination
ASTM E1742	Standard Practice for Radiographic Examination
IEST-STD-CC1246D	Product Cleanliness Levels and Contamination Control Program
ISO 14644-1	Clean rooms and Associated Controlled Environments
MIL-A-8625	Anodic Coating for Aluminum and Aluminum Alloys
MIL-C-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-DTL-13924	Coating, Oxide, Black, for Ferrous Metals
MIL-DTL-16232	Phosphate Coating, Heavy, Manganese of Zinc Base
MIL-PRF-83282	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, NATO Code Number H-537
MIL-HDBK-6870	Inspection Program Requirements Nondestructive for Aircraft and Missile Materials and Parts
MIL-PRF-23377	Primer Coating; Epoxy, High-Solids
MIL-S-5002	Surface Treatments and Inorganic Coatings for Metal Surfaces of Weapon Systems
MIL-DTL-83133	Turbine Fuels, Aviation
MSFC-PROC-166	Procedure for Hydraulic System Detailed Parts, Components, Assemblies, and Hydraulic Fluids for Space Vehicles, Cleaning, Testing, and Handling
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MSFC-SPEC-504	Requirement for Welding Aluminum Alloys
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MSFC-SPEC-2491	Cleaner, Aqueous
MSFC-SPEC-2492	Cleaner, Aqueous With D-Limonene
MSFC-STD-2497	Hand Wipe Cleaning Requirements
MSFC-STD-156	Standard for Riveting, Fabrication, and Inspection
MSFC-STD-246	Standard Design and Operational Criteria for Controlled Environmental Areas
MSFC-STD-366	Penetrant Inspection Method
MSFC Standard 486	Standard Threaded Fasteners, Torque Limit

MSFC-STD-561	Threaded Fasteners, Securing of Flight Hardware Used on Shuttle Payloads and Experiments
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SAE-AMS-2771	Heat Treatment of Aluminum Alloy Casting
SAE-AMS-2772	Heat Treatment of Aluminum Alloy Raw Materials
SAE-AMS-H-6875	Process for Heat Treatment of Steel
SAE-AMS-H-81200	Heat Treatment of Titanium and Titanium Alloys
SAE-AMS-QQ-N-290	Nickel Plating (Electrodeposited)
SAE-AMS-QQ-P-35	Passivation Treatment for Corrosion-Resistant Steel
SN-C-0005	NSTS Contamination Control Requirements
SNT-TC-IA-SET	Complete Set of ASNT-TC-1A Including All Supplements
TT-C-490	Cleaning Methods for Ferrous Surfaces and Pretreatments for Organic Coatings

VI. WBS 2.6 Reserved

VII. WBS 2.7 Space Environmental Effects Testing

Contamination Control Support

1. EM50-OWI-005
2. EM50-OWI-006
3. EM50-OWI-007
4. EM50-OWI-008
5. EM50-OWI-009
6. EM50-OWI-010
7. EM50-OWI-011
8. EM50-OWI-012
9. EM50-OWI-013
10. EM50-OWI-014
11. EM50-OWI-015
12. EM50-OWI-016
13. EM50-OWI-017
14. EM50-OWI-018
15. EM50-OWI-019
16. EM50-OWI-020
17. EM50-OWI-021
18. EM50-OWI-023
19. EM50-OWI-024
20. EM50-OWI-026
21. EM50-OWI-027
22. EM50-OWI-028
23. EM50-OWI-030
24. EM50-OWI-031
25. EM50-OWI-001

26. EM50-OWI-002
27. EM50-OWI-003
28. EM50-OWI-004
29. ASTM E1559
30. ASTM D3359
31. OWI 32 Patscantouchscreen (draft)
32. Sonotek Operation (draft)

Space Environmental Effects Testing

1. EM50-OWI-005
2. EM50-OWI-006
3. EM50-OWI-007
4. EM50-OWI-008
5. EM50-OWI-009
6. EM50-OWI-010
7. EM50-OWI-011
8. EM50-OWI-012
9. EM50-OWI-013
10. EM50-OWI-014
11. EM50-OWI-015
12. EM50-OWI-016
13. EM50-OWI-017
14. EM50-OWI-018
15. EM50-OWI-019
16. EM50-OWI-020
17. EM50-OWI-021
18. EM50-OWI-023
19. EM50-OWI-024
20. EM50-OWI-026
21. EM50-OWI-027
22. EM50-OWI-028
23. EM50-OWI-030
24. EM50-OWI-031
25. EM50-OWI-001
26. EM50-OWI-002
27. EM50-OWI-003
28. EM50-OWI-004
29. ASTM E1559
30. HiTEMS Operations Procedure (under development)
31. ED31 owi xxxc lambda19 (draft)
32. EM50-OWI-040
33. EM50-OWI-033
34. EM50-OWI-036
35. EM50-OWI-037
36. ITF-SOP-001
37. ITF-SOP-002
38. EWG Docs 01 16 07

ESL System Operations

1. EM50-OWI-005
2. EM50-OWI-006

3. EM50-OWI-007
4. EM50-OWI-008
5. EM50-OWI-009
6. EM50-OWI-010
7. EM50-OWI-011
8. EM50-OWI-012
9. EM50-OWI-013
10. EM50-OWI-014
11. EM50-OWI-015
12. EM50-OWI-016
13. EM50-OWI-017
14. EM50-OWI-018
15. EM50-OWI-019
16. EM50-OWI-020
17. EM50-OWI-021
18. EM50-OWI-023
19. EM50-OWI-024
20. EM50-OWI-026
21. EM50-OWI-027
22. EM50-OWI-028
23. EM50-OWI-030
24. EM50-OWI-031
25. EM50-OWI-001
26. EM50-OWI-002
27. EM50-OWI-003
28. EM50-OWI-004
29. ASTM E1559
30. HiTEMS Operations Procedure (under development)
31. ESL Facility OWI (draft)
32. esl laser safety rm 121
33. esl laser safety rm 123c

VIII. WBS 2.8 Reserved

IX. WBS 2.9 Environmental Gas Laboratory Support

1. EM10-OWI-CHM-050
2. EM10-OWI-CHM-051
3. EM10-OWI-CHM-052
4. EM10-OWI-CHM-056
5. MSFC-STD-246

X. WBS 2.10 Computer Aided Design Drawing

1. EV35-OWI-001
2. EV35-OWI-002
3. EV35-OWI-003
4. EV35-OWI-004
5. EV35-OWI-005
6. AMSE Y14.5M-1994

XI. WBS 2.11 Data Analysis and Database Entry for Materials and Processes Technical Information System (MAPTIS)

N/A

XII. WBS 2.12 Optics Support

Optical Coatings, Optical Fabrication and Metrology

1. XD32-OWI-003
2. XD32-OWI-100
3. MIL-PRF-13830B
4. MIL-C-675C
5. MIL-C-675C-A3
6. MIL-M-13508C
7. MIL-M-13508-C-A1

XIII. WBS 2.15 Tool Crib Operations

1. EM40-OWI-032
2. EM40-OWI-034
3. EM40-OWI-035

ATTACHMENT J-9

INSTALLATION-PROVIDED PROPERTY AND SERVICES

The Government will provide the use of the following property and services to all on-site personnel under this contract as necessary (reference G.6 - 1852.245-77 LIST OF INSTALLATION-ACCOUNTABLE PROPERTY AND SERVICES (JUL 1997)). The property and services provided include the following:

(1) Computer workstations (one seat license per workstation under MSFC's Outsourcing Desktop Initiative for NASA (ODIN) contract and accountable to the ODIN contract) and associated maintenance (general and specialized). The numbers historically provided include:
- ETF/EFDTF – Eight (8) seats
- Structural Test – Twelve (12) seats
- Materials Testing – Forty-six (46) seats (including contract management)
- Shop and Plating – Twenty (20) seats

(2) Printers, plotters, and scanners

(3) Application software

(4) Specialized Commercial-Off-The-Shelf (COTS) software as required to meet specific MSFC program/project objectives

(5) Document Reproduction Equipment and Reproduction Services

(6) Adequate work space and appropriate office furniture including technical work rooms, conference rooms, and storage areas

(7) Custodial and maintenance services

(8) A government vehicle (at MSFC) as needed for local travel

(9) Taxi service

(10) Telecommunication devices

Note: The Government anticipates no specific requirement for wireless telecommunication devices (e.g., cellular phones, pagers, and personal data assistants) and will not provide such devices. However, in the event wireless telecommunications devices are required to access NASA information technology (IT) systems or services (e.g., email), those devices shall be provided by the Government after obtaining Contracting Officer and COTR approval).

INSTALLATION SERVICES, FACILITIES AND MAJOR EQUIPMENT

The following is a description of the major facilities, test chambers, and support equipment to be used under this contract. This list is subject to change as new facilities, test chambers, and support equipment are added/removed to support test and fabrication requirements. The Contractor shall support all facilities, chambers, and equipment located at these major facilities.

I. WBS Element 2.1 Materials Testing

Materials Combustion Research Facility

The Government currently uses the MAPTIS database as the system to track and manage all work associated with Materials Testing. This is a Government developed system and will be available to the METTS Contractor.

The Materials Combustion Research Facility (MCRF), MSFC Building 4623, is one of the materials testing facilities that screen materials for their potential to safely be utilized on NASA missions. The MCRF houses the complete test systems to perform the materials testing that is required by NASA-STD-6001. The following are the test systems and capabilities that are housed within the MCRF:

Flammability Testing
The flammability test is used to determine a material's potential to burn in a given atmosphere or whether a material is self-extinguishing or nonflammable.

Oxygen Index Testing
Oxygen index testing determines the precise oxygen concentration that will support the combustion of a given material.

Ambient LOX Mechanical Impact Testing
The Liquid Oxygen (LOX) Mechanical Impact Test is used to determine the tendency of a material to react or ignite in a liquid oxygen environment using mechanical impact as the only ignition source.

High Pressure LOX/GOX Mechanical Impact Testing
The High-Pressure LOX/ Gaseous Oxygen (GOX) Mechanical Impact Test serves the same function as the ambient pressure test, with one exception: a material is tested in pressurized oxygen. The test determines if the material is an appropriate choice for an oxygen system when exposed to extreme pressures and temperatures (up to 10,000 psi and 1,000 ˚F).

Autogenous Ignition Temperature Testing
The autogenous ignition temperature (AIT) test quantitatively determines the temperature at which liquids or solids will "auto-ignite" up to a maximum of 800 ˚F (427 ˚C) and under pressures up to 10,000 psia

Gaseous Pneumatic Impact Testing
The gaseous pneumatic impact test determines the ignition sensitivity of materials and components when exposed to adiabatic compression in oxygen.

Promoted Ignition/Combustion Testing

The promoted ignition/combustion test ignites materials in high-pressure oxygen (up to 10,000 psia) to determine their combustion characteristics and to identify materials that fit design criteria and are most resistant to burning.

Heated Promoted Combustion Testing
Heated Promoted Combustion is the same as promoted ignition/combustion testing, but with conditions up to 10,000 psi at 900 ˚F and temperatures up to 2,000 ˚F at 3,000 psi.

Wire Insulation Flammability Testing
The Wire Insulation Flammability Test determines the combustion characteristics of wire insulations while they are carrying their maximum allowable current.

Toxicity Testing
Toxicity testing is conducted on both individual materials—primarily non-metals—and hardware assemblies that are candidates for space flight. The test is used to determine if the materials/hardware will release (or offgas) potentially harmful substances under the most extreme conditions they might experience during a mission and whether the amounts emitted are enough to pose any health threats.

Thermal Vacuum Stability
Thermal vacuum stability, or outgassing, testing refers to the test to determine the tendency of non-metallic materials to release volatile chemicals under the vacuum conditions present in space, causing the materials to degrade or become unstable

II. WBS Element 2.2 ETF/EFDTF Test Support

Aerodynamic Research Facility

The Aerodynamic Research Facility is an intermittent trisonic blow down tunnel operated from pressure storage to vacuum or atmospheric exhaust. The test section measures 14 inches by 14 inches in two of the interchangeable test sections. The transonic section has interchangeable fixed contour blocks and provides for Mach numbers of 0.20 through 1.96. The supersonic section has fixed contour plates positioned by hydraulic screw jacks and provides for Mach 2.75 through 5.00. The trisonic facility also has a special test section for a variety of test subjects, including nozzles. Flow Visualization is available with Schlieren, Shadowgraphs, Oil flows, and High-speed video.

Aerodynamic Research Facility Specifications

Normally invisible shock waves are shown through a flow visualization technique using Schlieren photography to visualize the airflow field inside the facility. Some other tunnel specifications are as follows:

- Reynolds Number: 1 to 18 million per foot
- Stagnation pressure: 22 psia to 80 psia
- Dynamic pressure: 2 psia to 20 psia
- Stagnation temperature: Ambient to 200 F; normally 100 F
- Air storage: 6000 cubic feet at 515 psia and 100 F
- Vacuum storage: 42,000 cubic feet at 0.1 psia
- Run time: 60 to 90 seconds (transonic), 30 to 40 seconds (supersonic)
- Recharge time: 10 to 15 minutes (transonic), 15 to 20 minutes (supersonic)
- Run rate: 15 to 20 runs per eight-hour shift

- Angle of attack: -10 degrees to +10 degrees with added range provided by offset stings up to 90 degrees

Aerodynamic Research Facility Instrumentation

The facility has a 200 channel pressure scanning system capability. Forces and moments are measured by an internal, six-component, strain-gage balance.

Nozzle Test Facility

The Nozzle Test Facility is an air/nitrogen blow-down facility used to evaluate the performance of rocket engine nozzles. It features variable test chamber pressure using a two-stage ejector system and nozzle model exit diameters up to 10 inches.

Nozzle Test Facility Performance

- Nozzle core flow: 8 pounds per second at 25 psia to 350 psia, up to 350 F
- Test chamber pressure range: atmospheric to 0.05 psia
- Run time: 2 minutes to 3 minutes

Nozzle Test Facility Instrumentation

- Steady and unsteady pressure measurement
- Test cabin pressure and temperature
- Up to 50 model pressures
- Capable of calibrating load cells to measure thrust and side forces
- Calibrated venturi for nozzle mass flow
- Nozzle exit flows visualized with Schlieren instrument
- Industry quality data acquisition system with Internet connection

Water Flow Pump Test Loop Facility

The Water Flow Pump Test Loop Facility is a closed-loop water flow facility used for testing full-scale models of liquid rocket engine pumps.

Description

- Closed-loop water system with 10,000-gallon reservoir
- 350 horsepower motor
- Dissolved oxygen monitoring
- Flow meter and flow control quiet valve
- Steam coil heating in reservoir
- All stainless piping

Performance

- Flow rates up to 5,000 gpm
- Inlet pressure: 5 psia to 165 psia
- Discharge pressures up to 500 psia
- Motor shaft speed: 360 rpm to 3,600 rpm shaft
- Reservoir temperature: Ambient to 150 F

Instrumentation
Steady state data system is available for test article and facility pressure monitoring. Unsteady data is measured real-time and recorded with 1 Hz to 30 kHz bandwidths.

Water Flow Inducer Test Loop Facility

The Water Flow Inducer Test Facility is a closed-loop water flow facility used to test low head-rise liquid rocket engine pump components such as inducers. The loop can handle flow rates up to 2,000 gpm with discharge pressures up to 200 psia. A vacuum pump deaerates the water and allows running with inlet pressures as low as 4 psia.

Description
- 6-inch and 8-inch diameter pipe construction
- Closed-loop, continuous water flow system (~400 gallon total volume)
- 150 horsepower AC motor with 4:1 belt/pulley driveline
- Variable speed controller for continuous adjustment of speed
- Stainless steel 100-gallon inline accumulator/deaeration tank
- 50 horsepower stainless steel auxiliary centrifugal pump
- Air pressurization/vacuum system for loop pressure control
- Water temperature control by way of steam

Performance
- Shaft speed range: 1,000 rpm to 7,000 rpm (either direction)
- Flow rate range: 250 gpm to 3000 gpm
- Water temperature range: 60 F to 150 F
- Inlet pressure range: 1 psia to 100 psia
- Discharge pressure range: Atmospheric to 200 psia
- Power/Torque Range: 100 horsepower/100 foot-pounds maximum
- Deaeration: down to 3 ppm

Instrumentation
- PC-based data acquisition system
- 6-inch turbine type flow meter
- Pressures (low frequency)
- 50 channels in 1 psia to 65 psia range
- 20 channels in 1 psia to 250 psia range
- 28 analog tape high frequency channels
- 100 contact high-speed slip ring system with shaft encoder

Specialized instrumentation, including high-speed video/photo as required

Air Flow Turbine Test Facility

The Air Flow Turbine Test Facility is an air blow down system that discharges to the atmosphere through a turbine test article and backpressure control valve. The test facility provides experimental data and scientific studies of gas turbines. It is capable of controlling inlet total temperature, inlet total pressure, pressure ratio, delta pressure across the turbine rig, and turbine revolutions per minute.

Description
- Airflow blow down system from 420 psia supply to atmospheric exhaust
- Stainless steel tunnel with two 6,000 cubic feet carbon steel storage tanks
- Closed-loop control of inlet pressure and temperature, pressure ratio and shaft speed
- Flow conditioning system consisting of wide-angle diffuser, honeycomb flow straightener, screens and sine law contraction
- 600 horsepower DC dynamometer with gearbox for power absorption and motoring
- Ambient or elevated air temperature control provided by in-line stainless steel tube bundles heated by an offline electric heater system

Performance
- Shaft speed range: +/-14,000 rpm
- Inlet pressure range: 30 psia to 300 psia
- Inlet temperature range: 530 R to 830 R
- Torque range: +/-1,000 foot-pounds
- Power absorption/motoring capacity: 600 horsepower (900 horsepower transient)
- Inlet flow turbulence intensity: approximately 10 percent
- Test duration: 100 seconds to 20 minutes

Instrumentation
- Subsonic mass flow venturi meters (2.1-inch and 3.4-inch diameter throats)
- Inline torque meter with 30, 500 and 1,000 feet-pound torque cartridges
- 512-channel PSI electronic pressure scanning system
- 240-channel low-level voltage input data system
- 6 channel remote control instrumentation positioning system
- 100 contact slip ring system for on-rotor measurements

Specialized instrumentation, including high-speed video/photo, as required

Solid Rocket Motor Air Flow Facility

The Solid Rocket Motor Air Flow Facility is currently inactive, however, it is anticipated that this facility will be activated during the first year of this contract. The Air Flow Facility is a high-pressure blow-down system operating from a 1,900 pounds psig storage vessel and discharging to atmosphere through a solid rocket motor test article. The facility provides the full-scale Mach number and Reynolds number internal flow conditions for a 10 percent scale advanced solid rocket motor model. The facility can provide bore flow or mass injection through porous walls to investigate the effects on internal flow fields due to gimballing a submerged nozzle, slot/port interactions, and other flow disturbances. The facility can also be configured for water flow testing.

Description
- Airflow blow-down system from 1,890 psia supply to atmospheric exhaust
- Carbon steel tunnel with a supply tank farm of 9,100 cubic feet carbon steel storage tanks
- Model inlets up to 16 inches in diameter

Performance
- Inlet pressure range: 600 psia to 1,200 psia
- Mass flow range: 20 pounds per second to 320 pounds per second
- Test duration: 30 seconds to 300 seconds

Instrumentation

- Sub-critical mass flow venturi meter
- 150 channel PSI electronic pressure scanning system
- 240-channel low-level voltage input data system
- Specialized instrumentation, such as pressure probes/rakes, as required

ETF Test Chambers

CHAMBER	PRIMARY USE	VACUUM PRESSURES	TEMPERATURES	THERMAL CONDITIONING	DIMENSIONS	PUMPING SYSTEM
V1	Optical Cleanliness	5 x 10-7 torr	Ambient to 180°C	IR Lamps	4 ft dia x 7 ft	Mechanical & Turbo
V2	Optical Cleanliness	5 x 10-7 torr	Ambient to 180°C	IR Lamps	4 ft dia x 10 ft	Mechanical & Turbo
V3	Thermal Vacuum	5 x 10-8 torr	-100 to 100°C	IR Lamps, LN2	4 ft dia x 10 ft	Mechanical & Diffusion
V4 & V8	Vacuum Bakeout	1 x 10-6 torr	Ambient to 175°C	IR Lamps	2 ft dia x 2.5 ft	Mechanical & Diffusion
V5	Thermal Vacuum	1 x 10-6 torr	-170 to 150°C	IR Lamps, LN2	3 ft dia x 4 ft	Mechanical & Diffusion
V6	Thermal Vacuum	1 x 10-7 torr	-170 to 150°C	IR Lamps, LN2	3 ft dia x 4 ft	Mechanical & Turbo
V7	Vacuum Bakeout	5 x 10-7 torr	-170 to 150°C	IR Lamps, LN2	8 ft dia x 10 ft	Mechanical, Cryogenic, & Turbo
V9	Vacuum Bakeout	1 x 10-6 torr	Ambient to 170°C	IR Lamps, LN2	4 ft dia x 7 ft	Mechanical & Turbo
V10	Life Cycle	5 x 10-8 torr	Ambient	N/A	1.5 ft dia x 1.5 ft	Mechanical & Ionization
V11	Launch Simulation	1 x 10-6 torr	-240 to 340°C	IR Lamps, LHe	4 ft dia x 10 ft	Mechanical & Turbo
RAC1	Launch Simulation	Plenum			4 ft dia x 10 ft	Mechanical & Turbo
Bell Jar	Vacuum Effect Demo	1 x 10-6 torr	-100 to 100°C	IR Lamps, LN2	1.5 dia ft x 2 ft	Mechanical & Turbo
V15 (Under Construction)	Thermal Vacuum	1 x 10-7 torr	-170 to 180 °C	IR Lamps, LN2	12 ft dia x 15 ft	TBD
Sunspot	Thermal Vacuum	1 x 10-6 torr	-170 to 200°C	IR Lamps, LN2	10 ft dia x 12 ft	Mechanical, Cryogenic, & Turbo
V20	Thermal Vacuum	1 x 10-6 torr	-170 to 200°C	IR Lamps, LN2	20 ft dia x 28 ft	Mechanical, Cryogenic, & Turbo
TH1 TH2 TH3 TH5 TH6 TH7 & TH8	Thermal Humidity	Ambient	-70 to 190°C	Electrical resistive and refrigeration	4 x 4 x 4 ft	
TH4	Thermal Humidity	Ambient	-70 to 160°C	Electrical resistive and refrigeration	4 x 5 x 4 ft	
V14	Vacuum Bakeout	1 x 10-6 torr	Ambient to 150ºC	IR Lamps	12 x 8 ft	Mechanical & Turbo

TA1	Thermal Altitude	Ambient to 100,000 ft	-70 to 190°C	Electrical resistive and refrigeration	4 x 4 x 4 ft	
TA2	Thermal Altitude	Ambient to 150,000 ft	Ambient to 200°C	Electrical Resistive	1.5 x 2 x 1.5 ft	
TA3	Thermal Altitude	Ambient to 200,000 ft	Ambient to 200°C	Electrical Resistive	1 x 1.5 x 1 ft	
TH9	Thermal Humidity	Ambient	-40 to 240°C	Electrical resistive and refrigeration	2.5 x 2.5 x 3 ft	
Salt Fog (Under Construction)	Corrosive Age	Ambient	TBD	TBD	4 x 4 x 8 ft	
RAC2 (Under Construction)	Launch Simulation	TBD	TBD	TBD	TBD	TBD

III. WBS Element 2.3 Structural Test Support

Load Test Annex (LTA) Crosshead, Bldg 4619:

The primary feature of the central high bay is a 169-ft by 161-ft by 155-ft load reaction facility with a 60-ft by 75-ft access door and a massive 55-ft by 55-ft concrete test floor below a moveable load reaction crosshead. The crosshead is adjustable in height from 40-ft to 115-ft in 5.5 inch increments. Loads of 30 million lbf vertically and 2.4 million lbf laterally can be reacted in the facility. The facility includes overhead bridge cranes for test article and materials handling.

Load Test Annex Extension (LTAE) East High Bay, Bldg 4619:

The east high bay is a 95-ft by 203-ft by 97-ft bay area with a 40-ft by 40-ft access door and a massive 70-ft by 160-ft concrete test floor. Reaction load plates, 400,000 lbf tension and 45,000 lbf shear per plate, are symmetrically affixed to the test floor on 10-ft centers. The facility includes overhead bridge cranes for test article and materials handling. The highbay floor area is used for material staging, fabrication and buildup activities, and test operations. Within the high bay area there are three universal self reacting load structures with the following capabilities:

- 20ft Universal Test Frame, Bldg 4619: This self-reacting load structure is used for medium to large scale static structural loads testing. The interior dimension of the structure is approximately 20-ft by 20-ft by 20-ft. The structure has a single point load capacity of approximately 100,000 lbf.

- 10ft Generic Test Cube, Bldg 4619: This self reacting load structure is used for small to medium scale static structural load testing. The interior dimension of the structure is approximately 10-ft by 10-ft by 10-ft. The structure has a single point load capability of 50,000 lbf. Approximate number of tests performed in the last 3 years:

- Multi Purpose Test Fixture, Bldg 4619: This load reaction structure is used for small scale and bench-top style static structural load testing. The interior dimension of the structure is approximately 7-ft by 5-ft by 6-ft. The structure has a single point load capability of 25,000 lbf.

120 klb SATEC Tensile Test Machine, Bldg 4619:

This tensile test machine accommodates small components and specimens. The column width is 33.5 inches with adjustable height to 60 inches. Load ranges 2.4 k, 6 k, 24 k and 120 k lbf in uni-axial tension or compression.

260 klb Instron Tensile Test Machine, Bldg 4619:

This tensile test machine accommodates small components and specimens. The column base is 4 ft x 4 ft with adjustable height to 112 inches. The load range is 260,000 lbf in uni-axial tension or compression with variable speed controller for positioning crosshead.

2M lbf Tensile Test Machine, Bldg 4619:

This tensile test machine accommodates smaller test components and specimens. The column base is 2 ft x 2 ft with adjustable height to 12 ft minus load cell height. This machine has 2 million lbf load capability in uni-axial tension or compression.

Gilmore Tensile Test Machine, Bldg 4619:

Gilmore Tensile Test Machine, Bldg 4619: This tensile test machine can accommodate mid-size structures up to 10-ft x 10-ft x 25-ft. Actual load capability to 2 million lb in uniaxial tension or compression to failure (shock) and 3 million lbf in uniaxial tension or compression without failure (no shock).

Cryogenic Structural Test Facility, Building 4699:

Cryogenic Structural Test Facility, Building 4699: This facility is located in the MSFC propulsion test area and provides cryogenic simulation, structural strength test, and pressurization test capability in a remote area controlled for hazardous test operations. This facility can be utilized whenever hazards associated with structural test operation preclude testing at Building 4619. Test article dimensions up to 33-ft diameter and 60-ft tall can be accommodated. A load reaction structure that is compatible with load application systems is in place for tensile, compression, moment, and shear loads.

Vibration Test Facility, Bldg. 4619 East Side:

The Vibration Test Facility, Bldg. 4619 East Side has 4 electromagnetic shakers with force inputs up to 40,000 lbf. All vibration modes (sine, random, sine-on-random, burst, chirp, etc.) are available. 36 channels of accelerometer signal conditioning, 64 channels of recording capability. 80 dB dynamic range, real time 32 channel control. Shaker head expanders allow test article mounting surfaces up to 5-ft by 5-ft. Variety of accelerometers with measurement capabilities up to 5000 g's.

Vibration Test Facility, Bldg. 4619 West Side:

The Vibration Test Facility, Bldg. 4619 West Side has 4 electromagnetic shakers with force inputs up to 40,000 lbf. All vibration modes (sine, random, sine-on-random, burst, chirp, etc.) are available. 84 channels of accelerometer signal conditioning, 96 channels of recording capability. 80 dB dynamic range, real time 32 channel control. Shaker head expanders allow test article mounting surfaces up to 5-ft. by 5-ft. Variety of accelerometers with measurement capabilities up to 5000 g's.

Pyroshock Test Facility, Bldg. 4619:

The Pyroshock Test Facility has pyrotechnic explosives capable of generating up to 30,000 g's SRS & 20,000 Hz, with shock accelerometers capable of measuring up to 50,000 g's. Chamber size is 1200 ft^2. 16-channel data acquisition system is capable of time domain and SRS analysis.

Anechoic Acoustic Test Facility, Bldg. 4619:

The Anechoic Acoustic Test Facility is a 3000 ft^3 anechoic chamber which is quieter than NC-40 requirement, up to 8 microphone and 32 accelerometer channels available for recording and analysis.

Reverberation Acoustic Test Facility, Bldg. 4619:

The Reverberation Acoustic Test Facility is a 5000 ft^3 concrete reverberation chamber capable of providing up to 2000 acoustic Watt input, 172 dB overall (OA) sound pressure level (SPL) in progressive wave tube and 164 dB OA SPL in diffuse field. Test articles up to 500 ft^3 can be placed in the diffuse field. Electromagnetic drivers are available for noise levels up to 139 dB OA SPL. Up to 8 microphone multiplex control and 32 accelerometer response channels are available for recording and analysis. Control tolerances are +/- 2 dB OA between 50-10,000 Hz.

Modal Test Facility, Building 4619:

The Modal Test Facility contains shakers and impulse hammers with input forces of up to 1000 lbs can be applied to test articles. At least 755 structural test array accelerometers, measurement range 2-1000 Hz. Simultaneous acquisition and time averaging of up to 260 channels of force input and acceleration response is available. Non-contact optical measurement techniques such as modal holography, electronic speckle pattern interferometry (ESPI), and laser vibrometry are also available for test articles of various sizes, configurations, and bandwidths.

Structural Dynamic Test Facility, Building 4550:

The Structural Dynamic Test Facility, Building 4550 is 360 feet tall; 15 levels (24 ft/level), max overall height 425 ft with 16-ton crane. Facility upgrades such as electrical power and platform removal are in planning phases, as well as refurbishment of four hydrodynamic supports to simulate free-free boundary conditions of full-scale launch vehicle. Shakers and instrumentation as described in the Modal Test Facility can be moved to this building.

IV. WBS Element 2.4 Fabrication and Assembly of R&D Space Flight and Associated Hardware

The following list is a summary of equipment (excluding many various hand tools) currently utilized to accomplish work in the fabrication services area. The actual equipment at contract start may slightly vary due additions or excessing during RFP. The Contractor shall verify this list during phase-in. Computer numerical controlled equipment is noted with an asterisk (*).

1. Metal Working Lathes:

*Binns & Berry	33.4” Swing, 22’L x 6’H x 6’W
Bridgeport (1)	ROMI Tormax 13-5
Leblond	36-inch Swing, Broken Bed
Leblond	21-inch Swing, Hollow Spindle
*Mazak	Universal, 14’L x 8’H x 4’W
*Mazak	Slant Turn
Monarch (4)	10-inch Swing, EE Models, Precision
Monarch (6)	6” – 48” Swing
Sidney	14-inch Swing, Heavy Duty
Turrett America (AML) (4)	8-inch Swing, Finishing Lathe

2. Milling Machines:

Bridgeport (6)	Vertical Spindle Knee Mills
Giddings & Lewis	Horizontal Boring Mill, Model 65-E4-T-3X
Giddings & Lewis (2)	Horizontal Boring Mills, Model 70-D3-T
Kearney & Trecker	Horizontal Spindle Knee Mill, Model TF-20
Kearney & Trecker (1)	Horizontal Spindle Knee Mills, Model S-12
Kearney & Trecker (2)	Vertical Spindle Knee Mills, Model TF-16
Lagun (2)	Vertical Spindle Knee Mills

3. Precision Jig Bores:

Moore (4)	Model No. 2
Pratt & Whitney	Model 2E
Pratt & Whitney	Model 3E
Pratt & Whitney	Model 4E

4. EDM Machines:

*Elox	EDM plunge
*Mitsubishi (3)	4-axis Wire, EDM
*Mitsubishi	Sinker
Mitsubishi	ED2000M Hole Popper

5. Radial Arm Saws:

DoAll (2)	Model 1613-2
DoAll	Model 2013
Marvel	Model 24/E1/E3
Marvel	Model 8/M1

6. Rotary Saws:

Hendrick	Traverse Skill Saw
Trenn Jaeger	Model LKH 310/4500

7. Radial Arm Drill:

Carlton	8-inch arm; 19-inch circumference

8. Power Hacksaws:

Marvel	Series 24
Peerless	Model M14-520
W.F. Wells	Hacksaw

9. Tube Flaring/Bending:

Lakeland	Tube Bending, Model 848

10. Flex High Pressure Hose Fabrication:

Aero-Quip	Aero-Quip Flex Hose Crimper
Resis-T-Oflex	Resistoflex Hose Crimper

11.	Fabricators (Metal):	
	Strippitt	Strippitt Super 30-40HD
	Wales	10-AA Fabricator Model 987
12.	Metal Rolls:	
	Buffalo	Model #2 BR
	Wysong	Model 8-48, 12-14 gauge
13.	Iron Worker:	
	Mubea	Universal Iron Worker
14.	Metal Press Brake:	
	Accurpress	Model 725014, 14’ bed, 250 ton
	Accurpress	Model 7606, 6’ bed, 60 ton
	Clausing	Allsteel Model 20-4
15.	Metal Shears:	
	Cincinnati	Model 1412, 168” x 3/16”
	Pacific	Model 625 A14 14’
16.	Contour Projectors:	
	Ex-Cello	Model 30
17.	Vertical Turing Lathes:	
	Giddings & Lewis	48-inch diameter Table
	Giddings & Lewis	144-inch diameter Table
18.	Tool Grinders:	
	Cincinnati	Universal MONOSET Tool Sharpener
19.	Precision Grinders:	
	Brown & Sharpe	Surface Grinder
	Brown & Sharpe	No. 1 Universal Cylinder Grinder
	Brown & Sharpe	Universal Cylinder Grinder
	Moore	Ultra Precision Jig Grinder
	Thompson	6 ft. x 3 ft. Surface Grinder
	Thompson	Surface Grinder
20.	Disc Sanders:	
	Standard	Disc Sander, Model 100
	State	D16
	Wysong	Disc Sander, Model 309
21.	Hydraulic Presses:	
	Dake	Hydraulic Presses, Model 5-075
	Lake Erie	Hydraulic Press, S/N 3227
	Wilson	Hydraulic Press, Model 37FMDI 75 ton
22.	CNC Machines:	
	*Bridgeport	EZ-Trak Plus Vertical Mill
	*Bridgeport	EZ-Trak DKII Vertical Mill
	*Cincinnati	5-axis, 20 V

*Cincinnati	5-axis, 30 V
*Cincinnati (2)	3-axis, Saber
*Cincinnati (3)	3-axis, Arrow
*Fadal Engineering Co. (2)	3-axis, Machining Center, VMC4020HT 17.5" x 17.5" x 29.5"
*Fadal Engineering Co.	4-axis, Machining Center. VMC4020HT 17.5" x 17.5" x 29.5"
*Giddings & Lewis	3-axis, 120" x 48"
*Giddings & Lewis	5-axis, Horizontal Boring Mill
*Hitachi Seiki	2-axis, Turning Center, 8 ¼" Dia. x 15"
*Kearney & Trecker	3-axis, 168" x 50" x 18"
*Onsurd	3-axis, Skin Mill, 330" x 120" x 18"
*Fadal	3-axis, VMC 6030 HT

23. Computer Equipment:

Intergraph	TD425 CAD
Zebra (3)	Label Printer

24. Optical Alignment/QA Equipment:

Brunson Instrument (7)	Transit Jig
Brunson Instrument	Sight Level
Brunson Instrument (15)	Instrument Stands up to 10'
Hilger & Watts (4)	Clinometers
Keuffel & Esser (5)	Optical Alignment Stands
Keuffel & Esser (4)	Level Sight
Keuffel & Esser (1)	Transit Surveying
Kollmorgen Corp. (5)	Instrument Stands with traverse
Kollmorgen Corp. (2)	Autocollimator
Leica	Mancat Coordinate System
Leica (2)	Instrument Stands
Leica	DL2 Laser
Toriod Corp. (2)	Indicator/Controller
Wild Heerbrugg (3)	Theodolites
Wild Heerbrugg (2)	Level High Precision
Hexagon Metrology	LTD840 Laser Tracker

25. Precision Measuring Equipment

Mitutoyo (2)	Coordinate measuring machine
Giddings & Lewis	Profile measurement system
TESA	White light measuring system
Kodak (2)	Optical Computer
Excello	Optical Computer
Brown & Sharpe (2)	Micro-Hite electronic height gage
Rockwell (2)	Hardness tester
Space Electronics	Mass properties machine
Snap-On	Torque wrench calibrator
TESA	Precision distance measuring system

26. Welding Equipment:

Airline Automatic (2)	Longitudinal welders, 54 and 80 inches and weld length

Aronson	Rotary Weld Positioner, 10,000 lb. capacity
Hamilton Standard	High Vacuum Electron Beam Welding
Hamilton/Zeiss	High Vacuum Electron Beam Welding System 75 KVA
Lincoln Electric	Pro-cut 125, Portable Plasma Cutter w/maximum capacity of 1.25" of steel.
Linde	Metal shape cutting machine equipped with both plasma arc and oxyacetylene cutting torches
Linde L-Tec	GTA weld equipment
Miller Sync-A-Wave (4)	GTA weld equipment, Square Wave enabled for mixing of polarities, water-cooled on a mobile cart w/50' power cord.
Peer Equipment	Resistance Spot Welder 20 KVA
Sciaky	Vertical/Horizontal manipulator, vertical travel 0' to 13'/horizontal travel 0' to 11'
Miller Arrow Wave	Inverter based variable polarity

27. Heat Treatment Equipment:

ABAR	Vacuum brazing furnace, 24" x 36"; heat range of 1000-2250 degrees F, with vacuum 10-6
Grieve Hendry	Drying oven, heat range 100-350 degrees F; 5' x 5' x 6.5'
Lindberg - Car Bottom	Furnace, 130" deep x 70" high x 97" wide; heat range 100-2000 degrees F, with exothermic atmosphere
Lindberg	Furnace, 18" high x 24" wide x 72" long; heat range 100 degrees F, with endothermic atmosphere
Lindberg - Cyclone	Furnace, 36" high x 51" wide x 79" deep; heat range 100-1600 degrees F, with air atmosphere
Lindberg	Endothermic gas generator capable of producing 1250 cu./ft. of gas
Lindberg	Oil quenching capability is cooled by heat exchanger and will quench material 6' in diameter and 12' deep
Vacuum Industries, Inc.	Vacuum/partial/nonvac, heating capabilities Range to 2900F, hydrogen atmosphere capable, quick cooling w/use of argon backfill w/internal fan

28. Surface Treatment Equipment:

Acme	Chilling Unit for type III anodizing solution
ADF (2)	Pressure Washer Cabinet
Aerojet Tech Systems Co.	Approximately 22 large and 37 small processing tanks with chemical solutions for various processes, such as, cleaning for welding and painting, chromate conversion coating, phosphating, passivation, and degreasing. Tank sizes range from 5' wide x 10' deep x 24' long to 4' wide x 5' deep x 8' long. The electroplating area consists of electroless nickel; anodizing type II, and

	III; red, black, green, yellow, and gold dyes for anodize type II.
Branson (2)	Vapor Degreaser
Bendix	Ultrasonic Generator Cleaner
Landa	Pressure Washer (Gas)
MSFC	Cleaning Console
Selectron	Brush Plating Equipment
Silicon	Rectifiers with operating ranges of 0 to 50A and 0 to 1000A DC output
Vertrod	Heat sealers, impulse type, (4) 24", (3) 48", and (2) 60" long

30. Blasting Equipment:

Empire	Sandblast Equipment
Vacu-Blast	B4760 Sandblast Room, 10' x 15'
Zero Blast-n-Peen (2)	Glass Bead Peening Machine
Grid Blast	Glass bead (4'x4')

31. Buffing Equipment:

Hammond	Buffing Machine with variable speed
Hammond	Belt Sander
Hammond (2)	Buffing Machine with single speed

32. Material Handling Equipment:

4500 lb. forklift (short prong)
8860 lb. forklift
4680 lb. forklift
3600 lb. Clark Electric Forklift
400 lbs. Genie lift
20 ton cranes
Various lifting slings and spreader bars (up to #15,000)
1/2 T Pickup Truck
1 T Flatbed Truck

V. WBS Element 2.5 Electrical Fabrication, Test and Assembly

The following list is a summary of equipment (excluding many various hand tools) currently utilized to accomplish work in the electrical fabrication and test area. The actual equipment at contract start may slightly vary due additions or excessing during RFP. The Contractor shall verify this list during phase-in. Computer numerical controlled equipment is noted with an asterisk (*).

Electronic Fabrication

Daniels	Wire Crimp Pull Test Machine
Dillion	Wire Crimp Pull Test Machine
MSFC Work Stations	Work Station Console, 30" x 72"; variable voltage control, 6 magnifier lights, 3 Leica microscopes
Pace (4)	De-soldering Tool
Plato (4)	Tinning Pot
Strip Master	Wire Stripper
Thomas & Betts Co.	Hi-Ring Swaging Tool

Westinton	10K Environmental Station
Olympus (2)	Scopes with digital camera
CCR Co.	Conformal Coating Removal Workstation
Pro-Con Technologies	Mini Solder Wave
Aqueous	Batch Cleaner
Essemtec FLX2010	Automatic Pick & Place Machine
Essemtec	SP200AV Stencil Printer
BGA Placement/Rework Station	APE Sniper III
Vapor Phase Reflow System	R&D Technical Service RD-1
Vapor Degreaser	Baron Blakeslee MVR-215
Hirox BGA/SMT	Inspection System
Fancourt Lead Formers (2)	Model F1B/1 with die #'s FA4067 & FA4064
Conformal coating spray booths (2)	
Torroid winders	
Hydraulic connector contact crimper	Thomas & Betts
Pneumatic connector contact crimper	

Test Equipment

Automated Cable Test System	Schaffner W443
Discrete Component Test System	Testronics 201C
RLC Digibridge	Gen Rad 1689
Digital Test System	HP 82000
Digital Phosphor O-Scope	Tektronix TDS 5054
Slaughter Hipot Test Systems	
Programmable QuadTech Megohmmeters	
Clinton High Frequency Spark Tester	
Thermal Cycling Chambers	
Anatech Continuity Monitors	
National Instruments Data Acquisition System	
Information Scan Tech (IST) Operational Amplifier & Voltage Comparator Test Module	

VI. WBS Element 2.6 Reserved

VII. WBS Element 2.7 Space Environmental Effects Testing

The Space Environment Effects Facility personnel study materials' behavior in the space environment. Laboratory capabilities include simulation of orbital atomic oxygen, UV radiation, electron and proton radiation, plasma, thermal vacuum, meteoroid and space debris impacts, dust and rain impacts, and hydrodynamic code analysis. The combined environment effects test system has the capability of exposing materials to protons, low- and high-energy electrons, near-ultraviolet (NUV) radiation, and vacuum ultraviolet (VUV) radiation, either simultaneously or sequentially, then measuring reflectance in vacuum. Plasma propulsion techniques are analyzed using the Marshall Magnetic Mirror system. Data from ground simulations of the space environment is combined with results from various flight experiments to determine the optimum materials for use on spacecraft.

The SEE team studies all types of materials used in spacecraft: metals, ceramics, polymers, composites, optics, lubricants, adhesives, thermal control coatings, visual aids, solar cells, insulation, solar sail thin films, etc. These materials must maintain desired mechanical, optical, and electrical properties in the harsh environment of space. Flight experiment studies such as

LDEF (Long Duration Exposure Facility), the Passive Optical Sample Assembly (POSA) - I experiment, and the Materials on International Space Station Experiment (MISSE) are used to improve our understanding of space, especially the synergistic effects between all elements of the environment.

The Materials Contamination Team is responsible for establishing contamination control during all phases of hardware development, including design, manufacturing, assembly, test, transportation, launch site processing, on-orbit exposure, return, and refurbishment. The team's mission is to reduce the risk of component/hardware failure due to molecular contamination, particulate contamination, or foreign object debris. Contamination is a concern in the Space Shuttle with sensitive bondlines and reactive fluid (liquid oxygen) compatibility as well as for spacecraft with sensitive optics such as space telescopes.

The Materials Contamination Laboratory has a variety of facilities and instrumentation capable of contaminant detection, identification, and monitoring. State-of-the-art inspection techniques currently being used include optically stimulated electron emission (OSEE); near infrared (NIR) spectroscopy utilizing fiber optics; Fourier transform infrared (FTIR) spectroscopy; ultraviolet (UV) fluorescence; and x-ray fluorescence. Inspection instrumentation is evaluated for capability to detect contaminants (silicone, hydrocarbons and fluorocarbons) on a variety of material substrates (metallics, composites, optics, etc.). The team of engineers and technicians also develop contamination calibration standards, evaluate new surface cleanliness inspection technologies, and analyze enhanced deposition of contaminants in the presence of UV radiation. Databases are maintained by the team for process materials as well as outgassing and optical compatibility test results for specific environments.

FACILITIES AND MAJOR EQUIPMENT BUILDING LOCATIONS

4200 Area
4205, 4210

4400 Area
4464, 4487

4600 Area
4600, 4605, 4610, 4612, 4618, 4619, 4620, 4623, 4628, 4656

4700 Area
4702, 4704, 4705, 4707, 4708, 4711, 4712, 4755, 4760, 4777

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(b)(4)

ATTACHMENT J-11 (Reference Clause H.15)

SAFETY & HEALTH MANAGEMENT IMPLEMENTATION GUIDE AND ASSESSMENT MATRIX

Score	Commitment and Involvement (Element 1)		Worksite System and Analysis (Element 2)	Hazard Prevention and Control (Element 3)	Safety and Health Training (Element 4)
	A. Management	B. Employee			
10	Benchmarking indicates "best in Class." In areas of visible management leadership, responsibility/accountability, meaningful metrics, and incentive/recognition systems.	Employees fully involved, safety committees functioning well, is a complete behavior process functioning at least one year, employees involved in process planning and risk assessment.	All subelements fully in place and functioning well for at least one year.	All programs and subelements fully functioning for one year. Strong professional support.	All training processes functioning, all levels of personnel trained to identified needs, management training ongoing.
9	All subelements are in place and functioning well, but have as yet to reach full maturity.	All processes functioning but for limited time, employees involved to great extent.	All subelements in place, employees actively participating.	All programs and subelements in place and functioning.	All training processes established, management initial training complete.
8	One subelement not fully in place but all are being implemented.	Most processes in place, employee involvement growing.	All subelements functioning, employee participation growing.	At least five subelements functioning and one in final stage of implementation.	Most personnel trained to identified needs, training recordkeeping and recall system functioning.
7	Two subelements not fully implemented. Implementation in process on all elements. Employee participation and commitment widespread.	Process activities expanding through organization. Committees and teams functioning.	At least five subelements functioning and remainder established.-	At least four subelements functioning, remaining two developing.	Management and supervisor training in process; specialized training in process.
6	All subelements in process or in place. Strong management leadership and	Employee representatives functioning, joint committees	At least four subelements functioning and remaining three	Medical and safety programs strengthening.	Management training in process developed,

Score	Commitment and Involvement (Element 1)		Worksite System and Analysis (Element 2)	Hazard Prevention and Control (Element 3)	Safety and Health Training (Element 4)
	A. Management	B. Employee			
	commitment began, metric systems in place, resourcing appropriate.	functioning, participating in risk assessment and accident investigation.	in process, employee participation beginning to spread through organization.	Emergency preparedness program established and exercised.	supervisor training developed, training recordkeeping and recall system developed.
5	Management commitment and leadership accepted by workers, worker participation and commitment begun, metric system.	Employee representatives appointed/elected, committees beginning to perform functions (investigation, analysis, process improvement).	All subelements established, employees beginning to participate.	Rules written, medical and safety programs developing Personal Protective Equipment adequate.	Training template completed for all personnel, training needs identified, process development begun, recordkeeping and recall system being developed.
4	Management commitment and leadership flowing down to workers, metric systems being developed, incentive/recognition system in process.	All processes being established, involvement and awareness enhancement growing.	At least five subelements initiated including self-assessment, hazard reporting, mishap close call investigations.	Rules in process, emergency preparedness program being developed.	Training development in process, specialized training established. Mandatory training in process
3	Generally good management commitment and leadership, implementation plans approved for all elements	All process needs identified, awareness and involvement enhancement activities begun.	Job Hazard analysis established, investigations strengthened and include employee	Medical program initiated, safety and health program initiated.	Training needs evaluation complete, training templates in process, recordkeeping and recall system needs to be established
2	Management exhibits some aspects of leadership, accountability	Committees established, little activity, employee involvement	Plans established to implement all subelements, at least two	Personal protective equipment requirements established and	Training needs evaluation begun, training template forms developed.

Score	Commitment and Involvement (Element 1)		Worksite System and Analysis (Element 2)	Hazard Prevention and Control (Element 3)	Safety and Health Training (Element 4)
	A. Management	B. Employee			
	systems not well defined, employee participation framework defined, limited metrics.	beginning, awareness of process started.	subelements beginning to function.	being enforced, plans developed for other elements.	
1	Subelements have not been established to any significant extent, management leadership is lacking, little or no employee participation	No committees, little or no employee involvement, no process, little process planning.	Two or fewer subelements established, no self-inspection, shallow accident investigation process.	Few or no programs or subelements established, few written rules, limited enforcement.	Training needs not established, no management training, limited or no supervisor training.

ATTACHMENT 12

(RESERVED)

ATTACHMENT 13

(RESERVED)

ATTACHMENT 14

(RESERVED)

WD 2005-2008 (Rev 7) was first posted on 06/05/2007
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REGISTER OF WAGE DETERMINATIONS UNDER THE SERVICE CONTRACT ACT By direction of the Secretary of Labor	U.S. DEPARTMENT OF LABOR EMPLOYMENT STANDARDS ADMINISTRATION WAGE AND HOUR DIVISION WASHINGTON D.C. 20210
William W.Gross Director Division of Wage Determinations	Wage Determination No.: **2005-2008** Revision No.: **7** Date Of Revision: **05/29/2007**

States: **Alabama**, Tennessee

Area: Alabama Counties of Colbert, Franklin, Jackson, Lauderdale, Lawrence, Limestone, **Madison**, Marion, Marshall, Morgan, Winston
Tennessee Counties of Giles, Lawrence, Lincoln, Moore, Wayne

Fringe Benefits Required Follow the Occupational Listing

OCCUPATION CODE - TITLE	MINIMUM WAGE RATE
01000 - Administrative Support And Clerical Occupations	
01011 - Accounting Clerk I	13.47
01012 - Accounting Clerk II	14.65
01013 - Accounting Clerk III	16.77
01020 - Administrative Assistant	21.27
01040 - Court Reporter	17.16
01051 - Data Entry Operator I	11.66
01052 - Data Entry Operator II	13.89
01060 - Dispatcher, Motor Vehicle	16.31
01070 - Document Preparation Clerk	12.47
01090 - Duplicating Machine Operator	12.47
01111 - General Clerk I	10.80
01112 - General Clerk II	11.78
01113 - General Clerk III	13.86
01120 - Housing Referral Assistant	19.14
01141 - Messenger Courier	9.49
01191 - Order Clerk I	11.49
01192 - Order Clerk II	15.27
01261 - Personnel Assistant (Employment) I	13.56
01262 - Personnel Assistant (Employment) II	15.15
01263 - Personnel Assistant (Employment) III	16.41
01270 - Production Control Clerk	19.18
01280 - Receptionist	11.02
01290 - Rental Clerk	11.79
01300 - Scheduler, Maintenance	15.32
01311 - Secretary I	15.32
01312 - Secretary II	17.16
01313 - Secretary III	19.14
01320 - Service Order Dispatcher	13.83
01410 - Supply Technician	21.27
01420 - Survey Worker	16.81
01531 - Travel Clerk I	10.03
01532 - Travel Clerk II	10.62
01533 - Travel Clerk III	11.32
01611 - Word Processor I	12.34
01612 - Word Processor II	13.77
01613 - Word Processor III	16.31

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05000 - Automotive Service Occupations	
05005 - Automobile Body Repairer, Fiberglass	17.50
05010 - Automotive Electrician	16.73
05040 - Automotive Glass Installer	15.94
05070 - Automotive Worker	15.94
05110 - Mobile Equipment Servicer	14.45
05130 - Motor Equipment Metal Mechanic	17.50
05160 - Motor Equipment Metal Worker	15.94
05190 - Motor Vehicle Mechanic	15.98
05220 - Motor Vehicle Mechanic Helper	12.52
05250 - Motor Vehicle Upholstery Worker	15.22
05280 - Motor Vehicle Wrecker	15.94
05310 - Painter, Automotive	15.28
05340 - Radiator Repair Specialist	15.94
05370 - Tire Repairer	12.75
05400 - Transmission Repair Specialist	17.50
07000 - Food Preparation And Service Occupations	
07010 - Baker	10.84
07041 - Cook I	9.14
07042 - Cook II	10.27
07070 - Dishwasher	7.57
07130 - Food Service Worker	8.09
07210 - Meat Cutter	13.34
07260 - Waiter/Waitress	6.82
09000 - Furniture Maintenance And Repair Occupations	
09010 - Electrostatic Spray Painter	17.56
09040 - Furniture Handler	13.94
09080 - Furniture Refinisher	17.56
09090 - Furniture Refinisher Helper	14.41
09110 - Furniture Repairer, Minor	15.98
09130 - Upholsterer	17.56
11000 - General Services And Support Occupations	
11030 - Cleaner, Vehicles	8.48
11060 - Elevator Operator	8.06
11090 - Gardener	12.11
11122 - Housekeeping Aide	8.62
11150 - Janitor	8.06
11210 - Laborer, Grounds Maintenance	10.00
11240 - Maid or Houseman	7.48
11260 - Pruner	8.72
11270 - Tractor Operator	12.08
11330 - Trail Maintenance Worker	10.00
11360 - Window Cleaner	8.24
12000 - Health Occupations	
12010 - Ambulance Driver	14.33
12011 - Breath Alcohol Technician	14.33
12012 - Certified Occupational Therapist Assistant	19.60
12015 - Certified Physical Therapist Assistant	19.60
12020 - Dental Assistant	13.91
12025 - Dental Hygienist	20.44
12030 - EKG Technician	21.13
12035 - Electroneurodiagnostic Technologist	21.13
12040 - Emergency Medical Technician	14.33
12071 - Licensed Practical Nurse I	13.71
12072 - Licensed Practical Nurse II	15.40
12073 - Licensed Practical Nurse III	17.25
12100 - Medical Assistant	10.79
12130 - Medical Laboratory Technician	14.02
12160 - Medical Record Clerk	11.28
12190 - Medical Record Technician	13.60

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12195 - Medical Transcriptionist	12.65
12210 - Nuclear Medicine Technologist	30.65
12221 - Nursing Assistant I	9.11
12222 - Nursing Assistant II	10.25
12223 - Nursing Assistant III	11.18
12224 - Nursing Assistant IV	12.55
12235 - Optical Dispenser	13.68
12236 - Optical Technician	10.36
12250 - Pharmacy Technician	12.24
12280 - Phlebotomist	12.55
12305 - Radiologic Technologist	22.63
12311 - Registered Nurse I	21.81
12312 - Registered Nurse II	26.70
12313 - Registered Nurse II, Specialist	26.70
12314 - Registered Nurse III	32.30
12315 - Registered Nurse III, Anesthetist	32.30
12316 - Registered Nurse IV	38.70
12317 - Scheduler (Drug and Alcohol Testing)	17.28
13000 - Information And Arts Occupations	
13011 - Exhibits Specialist I	17.81
13012 - Exhibits Specialist II	21.81
13013 - Exhibits Specialist III	26.51
13041 - Illustrator I	17.81
13042 - Illustrator II	21.81
13043 - Illustrator III	26.51
13047 - Librarian	22.66
13050 - Library Aide/Clerk	13.17
13054 - Library Information Technology Systems Administrator	21.15
13058 - Library Technician	14.67
13061 - Media Specialist I	14.78
13062 - Media Specialist II	16.54
13063 - Media Specialist III	18.43
13071 - Photographer I	14.72
13072 - Photographer II	17.00
13073 - Photographer III	20.36
13074 - Photographer IV	24.89
13075 - Photographer V	30.21
13110 - Video Teleconference Technician	14.78
14000 - Information Technology Occupations	
14041 - Computer Operator I	13.39
14042 - Computer Operator II	17.39
14043 - Computer Operator III	18.63
14044 - Computer Operator IV	23.78
14045 - Computer Operator V	26.73
14071 - Computer Programmer I (1)	22.73
14072 - Computer Programmer II (1)	27.24
14073 - Computer Programmer III (1)	27.62
14074 - Computer Programmer IV (1)	27.62
14101 - Computer Systems Analyst I (1)	27.62
14102 - Computer Systems Analyst II (1)	27.62
14103 - Computer Systems Analyst III (1)	27.62
14150 - Peripheral Equipment Operator	13.39
14160 - Personal Computer Support Technician	23.78
15000 - Instructional Occupations	
15010 - Aircrew Training Devices Instructor (Non-Rated)	29.35
15020 - Aircrew Training Devices Instructor (Rated)	35.52
15030 - Air Crew Training Devices Instructor (Pilot)	36.76
15050 - Computer Based Training Specialist / Instructor	30.38
15060 - Educational Technologist	24.89
15070 - Flight Instructor (Pilot)	36.76

15080 - Graphic Artist	19.60
15090 - Technical Instructor	17.19
15095 - Technical Instructor/Course Developer	21.01
15110 - Test Proctor	17.16
15120 - Tutor	17.16
16000 - Laundry, Dry-Cleaning, Pressing And Related Occupations	
16010 - Assembler	7.59
16030 - Counter Attendant	7.59
16040 - Dry Cleaner	9.54
16070 - Finisher, Flatwork, Machine	7.59
16090 - Presser, Hand	7.59
16110 - Presser, Machine, Drycleaning	7.59
16130 - Presser, Machine, Shirts	7.59
16160 - Presser, Machine, Wearing Apparel, Laundry	7.59
16190 - Sewing Machine Operator	10.07
16220 - Tailor	10.54
16250 - Washer, Machine	8.23
19000 - Machine Tool Operation And Repair Occupations	
19010 - Machine-Tool Operator (Tool Room)	20.38
19040 - Tool And Die Maker	24.86
21000 - Materials Handling And Packing Occupations	
21020 - Forklift Operator	14.82
21030 - Material Coordinator	19.18
21040 - Material Expediter	19.18
21050 - Material Handling Laborer	10.29
21071 - Order Filler	10.87
21080 - Production Line Worker (Food Processing)	14.82
21110 - Shipping Packer	12.98
21130 - Shipping/Receiving Clerk	12.98
21140 - Store Worker I	10.81
21150 - Stock Clerk	14.66
21210 - Tools And Parts Attendant	14.82
21410 - Warehouse Specialist	14.82
23000 - Mechanics And Maintenance And Repair Occupations	
23010 - Aerospace Structural Welder	17.04
23021 - Aircraft Mechanic I	22.24
23022 - Aircraft Mechanic II	23.35
23023 - Aircraft Mechanic III	24.52
23040 - Aircraft Mechanic Helper	17.44
23050 - Aircraft Painter	19.32
23060 - Aircraft Servicer	19.34
23080 - Aircraft Worker	20.27
23110 - Appliance Mechanic	18.04
23120 - Bicycle Repairer	14.66
23125 - Cable Splicer	19.76
23130 - Carpenter, Maintenance	17.56
23140 - Carpet Layer	17.29
23160 - Electrician, Maintenance	23.21
23181 - Electronics Technician Maintenance I	16.30
23182 - Electronics Technician Maintenance II	25.55
23183 - Electronics Technician Maintenance III	26.62
23260 - Fabric Worker	16.54
23290 - Fire Alarm System Mechanic	18.79
23310 - Fire Extinguisher Repairer	15.72
23311 - Fuel Distribution System Mechanic	18.79
23312 - Fuel Distribution System Operator	16.80
23370 - General Maintenance Worker	16.43
23380 - Ground Support Equipment Mechanic	22.24
23381 - Ground Support Equipment Servicer	19.34
23382 - Ground Support Equipment Worker	20.27

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23391 - Gunsmith I	13.74
23392 - Gunsmith II	15.13
23393 - Gunsmith III	16.59
23410 - Heating, Ventilation & Air-Conditioning Mechanic	18.38
23411 - Heating, Ventilation & Air Conditioning Mechanic (R&D Facility)	19.30
23430 - Heavy Equipment Mechanic	18.38
23440 - Heavy Equipment Operator	17.87
23460 - Instrument Mechanic	22.74
23465 - Laboratory/Shelter Mechanic	15.88
23470 - Laborer	11.36
23510 - Locksmith	18.04
23530 - Machinery Maintenance Mechanic	23.32
23550 - Machinist, Maintenance	16.92
23580 - Maintenance Trades Helper	14.41
23591 - Metrology Technician I	22.74
23592 - Metrology Technician II	23.71
23593 - Metrology Technician III	24.65
23640 - Millwright	18.79
23710 - Office Appliance Repairer	18.09
23760 - Painter, Maintenance	17.56
23790 - Pipefitter, Maintenance	18.90
23810 - Plumber, Maintenance	18.06
23820 - Pneudraulic Systems Mechanic	18.79
23850 - Rigger	18.79
23870 - Scale Mechanic	17.29
23890 - Sheet-Metal Worker, Maintenance	18.38
23910 - Small Engine Mechanic	16.75
23931 - Telecommunications Mechanic I	18.38
23932 - Telecommunications Mechanic II	20.21
23950 - Telephone Lineman	18.38
23960 - Welder, Combination, Maintenance	18.38
23965 - Well Driller	18.79
23970 - Woodcraft Worker	18.79
23980 - Woodworker	16.43
24000 - Personal Needs Occupations	
24570 - Child Care Attendant	7.78
24580 - Child Care Center Clerk	9.71
24610 - Chore Aide	8.42
24620 - Family Readiness And Support Services Coordinator	12.00
24630 - Homemaker	12.32
25000 - Plant And System Operations Occupations	
25010 - Boiler Tender	18.86
25040 - Sewage Plant Operator	17.87
25070 - Stationary Engineer	18.86
25190 - Ventilation Equipment Tender	14.85
25210 - Water Treatment Plant Operator	17.56
27000 - Protective Service Occupations	
27004 - Alarm Monitor	11.88
27007 - Baggage Inspector	9.95
27008 - Corrections Officer	14.76
27010 - Court Security Officer	15.94
27030 - Detection Dog Handler	12.55
27040 - Detention Officer	14.76
27070 - Firefighter	15.94
27101 - Guard I	9.95
27102 - Guard II	12.55
27131 - Police Officer I	17.14
27132 - Police Officer II	19.05
28000 - Recreation Occupations	
28041 - Carnival Equipment Operator	8.93

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28042 - Carnival Equipment Repairer	9.38
28043 - Carnival Equpment Worker	7.40
28210 - Gate Attendant/Gate Tender	12.47
28310 - Lifeguard	11.10
28350 - Park Attendant (Aide)	13.95
28510 - Recreation Aide/Health Facility Attendant	10.18
28515 - Recreation Specialist	13.48
28630 - Sports Official	11.10
28690 - Swimming Pool Operator	15.65
29000 - Stevedoring/Longshoremen Occupational Services	
29010 - Blocker And Bracer	17.70
29020 - Hatch Tender	17.70
29030 - Line Handler	17.70
29041 - Stevedore I	16.90
29042 - Stevedore II	18.56
30000 - Technical Occupations	
30010 - Air Traffic Control Specialist, Center (HFO) (2)	33.27
30011 - Air Traffic Control Specialist, Station (HFO) (2)	22.94
30012 - Air Traffic Control Specialist, Terminal (HFO) (2)	25.27
30021 - Archeological Technician I	15.69
30022 - Archeological Technician II	17.56
30023 - Archeological Technician III	21.76
30030 - Cartographic Technician	23.09
30040 - Civil Engineering Technician	20.75
30061 - Drafter/CAD Operator I	15.69
30062 - Drafter/CAD Operator II	17.77
30063 - Drafter/CAD Operator III	18.64
30064 - Drafter/CAD Operator IV	22.94
30081 - Engineering Technician I	13.21
30082 - Engineering Technician II	15.89
30083 - Engineering Technician III	19.09
30084 - Engineering Technician IV	26.34
30085 - Engineering Technician V	30.74
30086 - Engineering Technician VI	37.17
30090 - Environmental Technician	22.19
30210 - Laboratory Technician	18.92
30240 - Mathematical Technician	23.77
30361 - Paralegal/Legal Assistant I	15.32
30362 - Paralegal/Legal Assistant II	18.99
30363 - Paralegal/Legal Assistant III	23.23
30364 - Paralegal/Legal Assistant IV	28.11
30390 - Photo-Optics Technician	22.75
30461 - Technical Writer I	19.60
30462 - Technical Writer II	23.96
30463 - Technical Writer III	27.92
30491 - Unexploded Ordnance (UXO) Technician I	21.13
30492 - Unexploded Ordnance (UXO) Technician II	25.57
30493 - Unexploded Ordnance (UXO) Technician III	30.65
30494 - Unexploded (UXO) Safety Escort	21.13
30495 - Unexploded (UXO) Sweep Personnel	21.13
30620 - Weather Observer, Combined Upper Air Or Surface Programs (3)	20.23
30621 - Weather Observer, Senior (3)	20.67
31000 - Transportation/Mobile Equipment Operation Occupations	
31020 - Bus Aide	9.74
31030 - Bus Driver	12.67
31043 - Driver Courier	12.63
31260 - Parking and Lot Attendant	8.86
31290 - Shuttle Bus Driver	13.43
31310 - Taxi Driver	9.91
31361 - Truckdriver, Light	13.43

31362 - Truckdriver, Medium	16.55
31363 - Truckdriver, Heavy	16.83
31364 - Truckdriver, Tractor-Trailer	16.83
99000 - Miscellaneous Occupations	
99030 - Cashier	9.06
99050 - Desk Clerk	6.90
99095 - Embalmer	21.13
99251 - Laboratory Animal Caretaker I	8.53
99252 - Laboratory Animal Caretaker II	13.46
99310 - Mortician	21.13
99410 - Pest Controller	12.10
99510 - Photofinishing Worker	10.58
99710 - Recycling Laborer	13.04
99711 - Recycling Specialist	14.78
99730 - Refuse Collector	11.78
99810 - Sales Clerk	10.45
99820 - School Crossing Guard	11.46
99830 - Survey Party Chief	14.67
99831 - Surveying Aide	9.04
99832 - Surveying Technician	12.37
99840 - Vending Machine Attendant	12.59
99841 - Vending Machine Repairer	14.42
99842 - Vending Machine Repairer Helper	12.59

ALL OCCUPATIONS LISTED ABOVE RECEIVE THE FOLLOWING BENEFITS:

HEALTH & WELFARE: Life, accident, and health insurance plans, sick leave, pension plans, civic and personal leave, severance pay, and savings and thrift plans. Minimum employer contributions costing an average of $3.16 per hour computed on the basis of all hours worked by service employees employed on the contract.

VACATION: 2 weeks paid vacation after 1 year of service with a contractor or successor; 3 weeks after 10 years, and 4 after 20 years. Length of service includes the whole span of continuous service with the present contractor or successor, wherever employed, and with the predecessor contractors in the performance of similar work at the same Federal facility. (Reg. 29 CFR 4.173)

HOLIDAYS: A minimum of ten paid holidays per year, New Year's Day, Martin Luther King Jr's Birthday, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day, and Christmas Day. (A contractor may substitute for any of the named holidays another day off with pay in accordance with a plan communicated to the employees involved.) (See 29 CFR 4174)

THE OCCUPATIONS WHICH HAVE PARENTHESES AFTER THEM RECEIVE THE FOLLOWING BENEFITS (as numbered):

1) Does not apply to employees employed in a bona fide executive, administrative, or professional capacity as defined and delineated in 29 CFR 541. (See CFR 4.156)

2) APPLICABLE TO AIR TRAFFIC CONTROLLERS ONLY - NIGHT DIFFERENTIAL: An employee is entitled to pay for all work performed between the hours of 6:00 P.M. and 6:00 A.M. at the rate of basic pay plus a night pay differential amounting to 10 percent of the rate of basic pay.

3) AIR TRAFFIC CONTROLLERS AND WEATHER OBSERVERS - NIGHT PAY & SUNDAY PAY: If you work at night as part of a regular tour of duty, you will earn a night differential and receive an additional 10% of basic pay for any hours worked between 6pm and 6am.

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If you are a full-time employed (40 hours a week) and Sunday is part of your regularly scheduled workweek, you are paid at your rate of basic pay plus a Sunday premium of 25% of your basic rate for each hour of Sunday work which is not overtime (i.e. occasional work on Sunday outside the normal tour of duty is considered overtime work).

**** HAZARDOUS PAY DIFFERENTIAL ****

An 8 percent differential is applicable to employees employed in a position that represents a high degree of hazard when working with or in close proximity to ordinance, explosives, and incendiary materials. This includes work such as screening, blending, dying, mixing, and pressing of sensitive ordnance, explosives, and pyrotechnic compositions such as lead azide, black powder and photoflash powder. All dry-house activities involving propellants or explosives. Demilitarization, modification, renovation, demolition, and maintenance operations on sensitive ordnance, explosives and incendiary materials. All operations involving regarding and cleaning of artillery ranges.

A 4 percent differential is applicable to employees employed in a position that represents a low degree of hazard when working with, or in close proximity to ordnance, (or employees possibly adjacent to) explosives and incendiary materials which involves potential injury such as laceration of hands, face, or arms of the employee engaged in the operation, irritation of the skin, minor burns and the like; minimal damage to immediate or adjacent work area or equipment being used. All operations involving, unloading, storage, and hauling of ordnance, explosive, and incendiary ordnance material other than small arms ammunition.

NOTE: These differentials are only applicable to work that has been specifically designated by the agency for ordnance, explosives, and incendiary material differential pay.

**** UNIFORM ALLOWANCE ****

If employees are required to wear uniforms in the performance of this contract (either by the terms of the Government contract, by the employer, by the state or local law, etc.), the cost of furnishing such uniforms and maintaining (by laundering or dry cleaning) such uniforms is an expense that may not be borne by an employee where such cost reduces the hourly rate below that required by the wage determination. The Department of Labor will accept payment in accordance with the following standards as compliance:

The contractor or subcontractor is required to furnish all employees with an adequate number of uniforms without cost or to reimburse employees for the actual cost of the uniforms. In addition, where uniform cleaning and maintenance is made the responsibility of the employee, all contractors and subcontractors subject to this wage determination shall (in the absence of a bona fide collective bargaining agreement providing for a different amount, or the furnishing of contrary affirmative proof as to the actual cost), reimburse all employees for such cleaning and maintenance at a rate of $3.35 per week (or $.67 cents per day). However, in those instances where the uniforms furnished are made of "wash and wear" materials, may be routinely washed and dried with other personal garments, and do not require any special treatment such as dry cleaning, daily washing, or commercial laundering in order to meet the cleanliness or appearance standards set by the terms of the Government contract, by the contractor, by law, or by the nature of the work, there is no requirement that employees be reimbursed for uniform maintenance costs.

The duties of employees under job titles listed are those described in the "Service Contract Act Directory of Occupations," Fifth Edition, April 2006, unless otherwise indicated. Copies of the Directory are available on the Internet. A links to the Directory may be found on the WHD home page at <http://www.dol.gov/esa/whd/> or through the Wage Determinations On-Line (WDOL) Web site at <http://wdol.gov/>.

05/29/2007

REQUEST FOR AUTHORIZATION OF ADDITIONAL CLASSIFICATION AND WAGE RATE {Standard Form 1444 (SF 1444)}

Conformance Process:

The contracting officer shall require that any class of service employee which is not listed herein and which is to be employed under the contract (i.e., the work to be performed is not performed by any classification listed in the wage determination), be classified by the contractor so as to provide a reasonable relationship (i.e., appropriate level of skill comparison) between such unlisted classifications and the classifications listed in the wage determination. Such conformed classes of employees shall be paid the monetary wages and furnished the fringe benefits as are determined. Such conforming process shall be initiated by the contractor prior to the performance of contract work by such unlisted class(es) of employees. The conformed classification, wage rate, and/or fringe benefits shall be retroactive to the commencement date of the contract. {See Section 4.6 (C)(vi)} When multiple wage determinations are included in a contract, a separate SF 1444 should be prepared for each wage determination to which a class(es) is to be conformed.

The process for preparing a conformance request is as follows:

1) When preparing the bid, the contractor identifies the need for a conformed occupation) and computes a proposed rate).

2) After contract award, the contractor prepares a written report listing in order proposed classification title), a Federal grade equivalency (FGE) for each proposed classification), job description), and rationale for proposed wage rate), including information regarding the agreement or disagreement of the authorized representative of the employees involved, or where there is no authorized representative, the employees themselves. This report should be submitted to the contracting officer no later than 30 days after such unlisted class(es) of employees performs any contract work.

3) The contracting officer reviews the proposed action and promptly submits a report of the action, together with the agency's recommendations and pertinent information including the position of the contractor and the employees, to the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, for review. (See section 4.6(b)(2) of Regulations 29 CFR Part 4).

4) Within 30 days of receipt, the Wage and Hour Division approves, modifies, or disapproves the action via transmittal to the agency contracting officer, or notifies the contracting officer that additional time will be required to process the request.

5) The contracting officer transmits the Wage and Hour decision to the contractor.

6) The contractor informs the affected employees.

Information required by the Regulations must be submitted on SF 1444 or bond paper.

When preparing a conformance request, the "Service Contract Act Directory of Occupations" (the Directory) should be used to compare job definitions to insure that duties requested are not performed by a classification already listed in the wage determination. Remember, it is not the job title, but the required tasks that determine whether a class is included in an established wage determination. Conformances may not be used to artificially split, combine, or subdivide classifications listed in the wage determination.

05/29/2007

ATTACHMENT J-16

ACRONYM LIST

ACI	Administratively Controlled Audit Agency
ACO	Administrative Contracting Officer
ADP	Acceptance Data Package
AF	Award Fee
AGT	Applied Geo Technologies
ANSI	American National Standards Institute
AO	Atomic Oxygen
AOO	Accounting Operations Office
ASD	Acquisition Strategy Development
ASM	Acquisition Strategy Meeting
ASM	American Society for Materials
ASQC	American Society for Quality Control
ASRI	Al Signal Research, Inc.
ASTM	American Society for Testing and Materials
ATP	Authority to Proceed
AVL	Audited Vendor List
AVO	Avoid Verbal Orders
AWS	American Welding Society
BAMSI	Brown and Associates Management Services, Incorporated
BICE	Bureau of Immigration and Customs Enforcement
BLM	Bureau of Land Management
BRAC	Base Realignment and Closure Commission
BXA	Bureau of Export Administration
CAD	Computer Aided Design
C&DM	Configuration and Data Management
CAE	Computer Aided Engineering
CAER	Customer and Employee Relations
CAM	Computer Aided Modeling
CAS	Cost Accounting Standard
CBA	Collective Bargaining Agreements
CBI	Confidential Business Information
CBDnet	Commerce Business Daily on Line Network
CCI	Consolidated Contracting Initiative
CCIP	Contamination Control and Implementation Plan

CCR	Central Contractor Registration
CCS	Center Chief of Security
CD	Compact Disk
CD	Contractual Data
CDR	Calibration Discrepancy Report
CDR	Critical Design Review
CD-R	Compact Disk Read Only
CEI	Component End Item
CERTRAK	MSFC Certification Database
CFR	Code of Federal Regulations
CG	Center of Gravity
CIL	Critical Items List
CITSPP	Contractor Information Technology Security Program Plan
CLIN	Contact Line Item
CM	Configuration Management
CMP	Configuration Management Plan
CNC	Computer Numerically Controlled
CO	Contracting Officer
CoC	Certificate of Compliance
COQ	Certification of Qualification
COR	Contracting Officer’s Representative
COTR	Contracting Officer's Technical Representative
COTS	Commercial Off the Shelf
CPAF	Cost Plus Award Fee
CPM	Critical Path Method
CPR	Core Program Requirements
CPR	Cost Performance Report
CR	Cost-reimbursable
CRT	Center Review Team
CSA	Canadian Space Agency
CSD	Common Schedules Database
CSEE	Combined Space Environmental Effects
CSO	Contractor’s Corporate Security Officer
CTA	Customer Test Agreement
CTR	Customer Test Requests
CWC	Collaborative Work Commitment
CY	Contract Year

D&F	Determination and Findings
D&R	Definition and Requirements
DAQ	Data Acquisition
DAR	Deviation Approval Request
DCAA	Defense Contract Audit Agency
DCL	Document Change Log
DCP	Development Cost Plan
DD	Defense Department
DDTF	Digital Design to Fabrication
DEF	Definition
DEI	Deliverable End Item
DOE	Department of Energy
DOL	Department of Labor
DPAS	Defense Contract Audit Agency
DPD	Data Procurement Department/Document
DPD	Data Project Description
DR	Design Review
DR	Discrepancy Record
DRD	Data Requirement Description/Document
DRFP	Draft Request for Proposal
DVD	Digital Voice Disk
°C	Degrees Celsius
°F	Degrees Fahrenheit
DOL	Department of Labor
DOD	Department of Defense
DOT	Department of Transportation
DPAS	Defense Priority and Allocation System
DPD	Data Procurement Description
DRD	Data Requirements Description
DRL	Data Requirements List
DUNS	Data Universal Numbering System
EAR	Export Administration Regulations
ECLSS	Environmental Control and Life Support System
ECN	Equipment Control Number
ECP	Engineering Change Proposal
ED	Engineering Directorate
EDMP	Experiment Data Management Plan

EEE	Electrical, Electronics, and Electromechanical
EEOH	Environmental Engineering & Occupational Health
EFDTF	Experimental Fluid Dynamics Test Facility
EGL	Environmental Gas Laboratory
ELV	Expendable Launch Vehicle
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMS	Environmental Management System
EPA	Environment Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EPTL	Electrical Parts Test Laboratory
EPS	Electronic Posting System
ESA	European Space Agency
ESL	Electrostatic Levitator
ESTS	Engineering Services and Technicians Services
ET	External Tank
ETF	Environmental Test Facility
EVM	Earned Value Management
EVMS	Earned Value Management System
EWS	Emergency Warning System
FAR	Federal Acquisition Regulation
FC	Fingerprint Card
FCA	Functional Configuration Audit
FDO	Fee Determination Official
FEC	Field Engineering Change
FHSO	Flight Hardware Support Operations
FICA	Federal Insurance Contribution Act
FIPS	Federal Information Processing Standards
FOP	Facility Operating Procedure
FPR	Final Proposal Revision
FRFP	Final Request for Proposal
FSO	Facility Security Officer
FTE	Full Time Equivalent
FTIR	Fourier Transform Infrared
G&A	General & Administrative Cost
GAO	General Accounting Office
GD&T	Geometric Dimensions and Tolerances

GFC	Gilmore Force Calibrator
GFE	Government Furnished Equipment
GFP	Government Furnished Property
GOX	Gaseous Oxygen
GRC	Glenn Research Center
GSA	General Services Administration
GSE	Ground Support Equipment
GTAW	Gas Tungsten Arc Welding
GU	Ground Unit
HTML	Hyper Text Mark-Up Language
HVAC	Heating, Ventilating, Air Conditioning
IACL	Intercenter Agreement Certification Letters
ICRC	Integrated Concepts Research Corporation
IDIQ	Indefinite Delivery Indefinite Quantity
IDMS	Identity Management System
IG	Inspector General
IGCE	Independent Government Cost Estimate
IHOPS	Inventory of Hazardous Operations
IMS	Integrated Manufacturing System
IQS	Integrated Quality System
ISO	International Organization for Standardization
ISS	International Space Station
IT	Information Technology
ITAR	International Traffic in Arms Regulations
JHA	Job Hazard Analysis
JOFOC	Justification for Other than Competitive Proposals
JSC	Johnson Space Center
KP	Key Personnel
KSC	Kennedy Space Center
LOCAD	Lab on a Chip Application Design
LOX	Liquid Oxygen
LR	Level of Secretary’s Responsibility
LS	Logistics/Support
LTA	Load Test Annex
LTC	Lost Time Case
LTAE	Load Test Annex Extension
LTIR	Lost Time Injury Rates

LVL	Limited Vendor List
MA	Management
MAPTIS	Materials and Processes Technical Information System
MBP	Master Buy Plan
MC	Management and Control
MCMS	Marshall Calibration Management System
MDL	Microgravity Development Laboratory
ME	Manufacturer Engineer
METTS	Marshall Engineering Technicians and Trades Support Services
MIDL	Marshall Integrated Document Library
Mil	Military
MIPs	Mandatory Inspection Points
MIS	Management Information Systems
MIUL	Materials Information and Usage List
MLC	Master List Custodian
MLI	Multi-layer Insulation
MMR	Monthly Management Review
MOU	Memorandum of Understanding
MPD	Marshall Procurement Directive
MPG	Marshall Procedural Guidance
MRB	Material Review Board
MRT	Microgravity Research Team
MS	Mission Services
MSC	Mission Support Contractor
MSDS	Material Safety Data Sheet
MSFC	Marshall Space Flight Center
MTA	Management and Technical Approach
MTAE	Materials Testing and Evaluation
MUA	Materials Usage Agreements
MWI	Marshall Work Instruction
NAC	National Agency Check
NACI	National Agency Check with Inquiries
NAICS	North American Industry Classification System
NAIS	NASA Acquisition Internet Service
NAR	Non-Advocate Review
NASA	National Aeronautic Space Administration

NCAM	National Center for Advanced Manufacturing
NCIC	National Crime Information Center
NDE	Nondestructive Evaluation
NFNMS	NASA Foreign National Management System
NFS	NASA Federal Acquisition Supplement
NIST	National Institute of Standards and Technology
NLRB	National Labor Relations Board
NPG	NASA Procedures and Guidelines
NPR	NASA Procedures and Requirements
NRA	NASA Research Announcement
NRRS	NASA Records Retention Schedule
NSCCB	Network Security Configuration Control Board
NSN	National Stock Number
NTE	Not to Exceed
NTSR	NASA New Technology Summary Report
NVR	Nonvolatile Residue
OCI	Organizational Conflicts of Interest
OCIO	Office of Chief Information Officer
ODC	Other Direct Cost
ODEO	Office of Diversity and Equal Opportunity
ODIN	Outsourcing Desktop Initiative for NASA
OFCCP	Office of Federal Contract Compliance Programs
OGE	Office of Government Ethics
OI	Organizational Instructions
OI	Organizational Issuances
OPR	Office of Primary Responsibility
OPRD	OPR Designee
ORCA	Online Representations and Certifications Application
ORIC	Operational Readiness Inspection Committee
OSHA	Occupational Safety and Health Administration
OWI	Organizational Work Instructions
PACS	Physical Access Control System
PC	Personal Computer
PC	Production Control
PCA	Physical Configuration Audits
PCH	Program Critical Hardware
PCI	Personal Identity Verification Card Issuance

PDA	Personal Digital Assistant
PDM	Project Data Management
PDR	Preliminary Design Review
PDTS	Procurement Discrepancy Tracking System
PEB	Performance Evaluation Board
PERT	Program Evaluation Review Technique
PIO	Paid Time Off
PIV	Personal Identity Verification
PKI	Public Key Infrastructure
PMC	Program Management Council
PO	Purchase Order
POC	Point of Contact
POP	Period of Performance
POP	Program Operating Plan
PPA	Pollution Prevention Act
PP&C	Pressurents, Propellants, and Calibration
PPE	Personal Protective Equipment
PQR	Procedure Qualification Records
PR	Purchase Request
PRACA	Problem Reporting and Corrective Action
PRB	Post-retirement Benefits
PRDL	Propulsion Research Development Laboratory
PRL	Page Revision Log
PS	Post Selection
PSAL	Project Specific Approved Supplier List
psi	pounds per square inch
PSM	Procurement Strategy Meeting
PWS	Performance Work Statement
QASP	Quality Assurance Surveillance Plan
QMS	Quality Management System
QSDN	Quality System Deficiency Notice
QTPS	Quality Test Preparation Sheet
RBAM	Risk Based Acquisition Management
RD	Requirements Development
RDR	Requirements Definition Review
RFP	Request for Proposal
RFQ	Request for Quotation

RFR	Request for Request
RID	Review Item Discrepancy
RLO	Records Liaison Officer
RSRM	Reusable Solid Rocket Motor
SA	Safety
SAA	Space Act Agreement
SAE	Society of Automotive Engineering
S&MA	Safety and Mission Assurance
SBA	Small Business Administration
SBA PCR	Small Business Administration Procurement Center Representative
SBS	Small Business Specialist
SBU	Sensitive but Unclassified
SCA	Service Contract Act
SCAP	Shared Capability Assessment Program
scf	Standard Cubic Feet
SD	Solicitation Development
SDB	Small Disadvantaged Business
SDOS	Systems Development and Operations Support
SEB	Source Evaluation Board
SEC	Source Evaluation Committee
SEE	Space Environmental Effects
SEMO	Supply and Equipment Management Officer
SF	Standard Form
SH	Safety, Health, and Environmental Initiatives
SHE	Safety, Health, and Environmental
SHP	Safety and Health Plan
SIC	Standard Industrial Classification
SIN	Special Identification Number
SK	Staffing and Total Compensation Plan
SOP	Standard Operating Procedure
SOW	Statement of Work
SP	Standard Procedure
SRB	Solid Rocket Booster
SRR	Systems Requirements Review
SS	Social Security
SS	Source Selection

SSA	Source Selection Authority
SSME	Space Shuttle Main Engine
SSN	Social Security Number
SSWP	Supervisor Safety Webpage
STA	Science and Technology Agency of Japan
STC	Staff and Total Compensation
STD	Standard
STE	Special Test Equipment
STO	Special Test Order
TAFT	Turbine Airflow Test
TASC	Testing and Analytical Support Contract
TBD	To Be Determined
TCR	Test Completion Report
T.I.A.S.	Treaties and Other International Acts Series
TIP	Test Implementation Plan
TM	Task Monitor
TO	Task Order
TOP	Task Order Plan
TOR	Task Order Request
TOXICITY	Toxic Offgassing
TP	Technical Performance
TPM	Technical Performance Measurement
TPO	Turbine Performance Optimization
TPS	Test Preparation Sheet
TRD	Test Requirements Document
TRR	Test Readiness Review
TSOW	Test Scope of Work
TST	Training Strategy Team
TTA	Technical Task Agreement
USML	U.S. Munitions List
U.S.	United States
U.S.C.	United States Code
US-CERT	United States Computer Emergency Readiness Team
U.S.T.	United States Treaties and Other International Agreements
UV	Ultraviolet
V&CS	Valve and Component Shop
VM	Visual Manufacturing

WBS	Work Breakdown Structure
WO	Work Order
WOQ	Welding Operation Qualification
WPQ	Welding Operator Qualification
WPS	Welding Procedure Specification
WSTF	White Sands Test Facility
WYE	Work Year Equivalent

ATTACHMENT 17

(RESERVED)

ATTACHMENT J-18

PERSONAL IDENTITY VERIFICATION PROCEDURES

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.

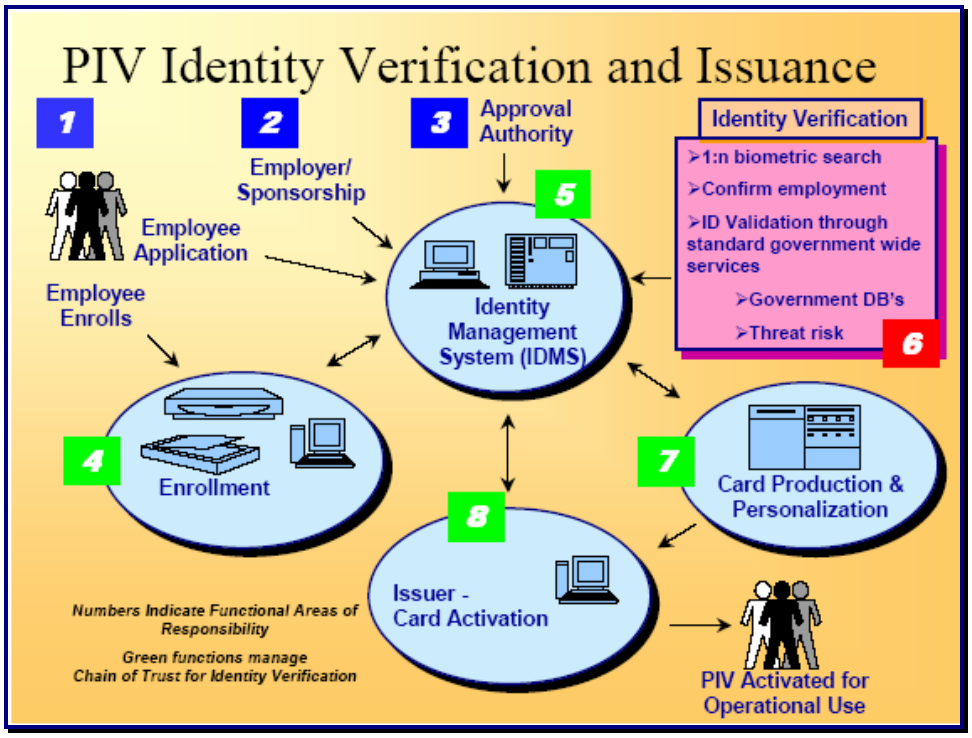

Figure A-1, FIPS 201, Appendix A

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 (NFNMS) 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 Federal[1] 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
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 a National Crime Information Center (NCIC) with an Interstate Identification Index check is/has been performed. 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

[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

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.

Contract NNM08AA20C

ATTACHMENT J-19

DOD FORM DD 254 CONTRACT SECURITY CLASSIFICATION AND SPECIFICATION

DEPARTMENT OF DEFENSE
CONTRACT SECURITY CLASSIFICATION SPECIFICATION
(The requirements of the DoD Industrial Security Manual apply to all security aspects of this effort.)

1. CLEARANCE AND SAFEGUARDING
a. FACILITY CLEARANCE REQUIRED
b. LEVEL OF SAFEGUARDING REQUIRED

	2. THIS SPECIFICATION IS FOR: *(X and complete as applicable)*			**3. THIS SPECIFICATION IS:** *(X and complete as applicable)*		
	a. PRIME CONTRACT NUMBER			a. **ORIGINAL** *(Complete date in all cases)*		Date *(YYMMDD)*
	b. SUBCONTRACT NUMBER			b. **REVISED** *(Supersedes all previous specs)*	Revision No.	Date *(YYMMDD)*
X	c. SOLICITATION OR OTHER NUMBER: NNM08125357R	Due Date *(YYMMDD)*: TBD		c. **FINAL** *(Complete Item 5 in all cases)*		Date *(YYMMDD)*

4. IS THIS A FOLLOW-ON CONTRACT? [X] **YES** [ ] NO. If Yes, complete the following:
Classified material received or generated under _____ *(Preceding Contract Number)* is transferred to this follow-on contract.

5. IS THIS A FINAL DD FORM 254? [ ] YES [X] **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 CODE	c. COGNIZANT SECURITY OFFICE *(Name, Address, and Zip Code)*
TBD	TBD	TBD

7. SUBCONTRACTOR

a. NAME, ADDRESS, AND ZIP CODE	b. CAGE CODE	c. COGNIZANT SECURITY OFFICE *(Name, Address, and Zip Code)*

8. ACTUAL PERFORMANCE

a. LOCATION	b. CAGE CODE	c. COGNIZANT SECURITY OFFICE *(Name, Address, and Zip Code)*
NASA George C. Marshall Space Flight Center Marshall Space Flight Center, AL 35812	N/A	TBD

9. GENERAL IDENTIFICATION OF THIS PROCUREMENT
Marshall Engineering Technicians and Trades Support (METTS) Services at Marshall Space Flight Center

10. CONTRACTOR WILL REQUIRE ACCESS TO:	YES	NO	**11. IN PERFORMING THIS CONTRACT, THE CONTRACTOR WILL:**	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)*					

DD Form 254, DEC 90 (EG) *Previous editions are obsolete.* (MS Word 4/96)

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 [X] Through *(Specify)*

Public Affairs Office, CS20, George C. Marshall Space Flight Center, Marshall Space Flight Center, AL 35812
(must provide four (4) copies)

to the Directorate for Freedom of Information and Security Review, Office of the Assistant Secretary of Defense (Public Affairs)* for review.
*In the case of non-DoD User Agencies, requests for disclosure shall be submitted to that agency.

13. SECURITY GUIDANCE. The security classifiection 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 this contract; and to submit any questions for interpretation of this guidance to the official identified below. Pending final decision, the information involved shall be handled and protected at the highest level of classification assigned or recommended. *(Fill in as appropriate for the classified effort. Attach, or forward under separate correspondence, any documents/guides/extracts referenced herein. Add additional pages as needed to provide complete guidance.)*

Security clearances and classified access is limited to TBD Work. Clearances and access is not authorized for other tasks.
Changes shall be furnished if it is determined to be necessary.

Security clearances should be held at a minimum to perform the task.

Classification Guides:

NASA Procedures and Guidelines, Security Procedures and Guidelines, NPG 1620.1, November 18, 1999
National Industrial Security Program, Operating Manual, DoD 5220.22-M

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 [X] 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 [X *] No

*Except for employees assigned to MSFC physically.

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.

a. TYPED NAME OF CERTIFYING OFFICIAL	b. TITLE	c. TELEPHONE *(Include Area Code)*
Bradford W. Garland	COR Security	(256) 544-4537

d. ADDRESS *(Include Zip Code)*

NASA/Marshall Space Flight Center
AD50
MSFC, AL 35812

e. SIGNATURE

17. REQUIRED DISTRIBUTION

[X]	a. CONTRACTOR
[ ]	b. SUBCONTRACTOR
[X]	c. COGNIZANT SECURITY OFFICE FOR PRIME AND SUBCONTRACTOR
[ ]	d. U.S. ACTIVITY RESPONSIBLE FOR OVERSEAS SECURITY ADMINISTRATION
[X]	e. ADMINISTRATIVE CONTRACTING OFFICER
[X]	f. OTHERS AS NECESSARY

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ATTACHMENT J-20

NASA MSFC Safety & Mission Assurance Surveillance Plan Responsibilities and Requirements

1. General:

This document sets forth the Quality Assurance (QA) functions to be performed for NASA Marshall Space Flight Center (MSFC) on Contract NNM08AA20C in accordance with the scope of the contract Performance Work Statement (PWS), WBS 2.4.

This surveillance plan is written to perform surveillance activities at both the contract level and task level based on the products and services provided to MSFC NASA. This plan is tailored based on FAR Regulation Part 46, NPR 8735.2, "Management of Government Quality Assurance Functions for NASA Contracts" paragraph section Chapter 2, and MPR 5000.1, "Purchasing", Section 3.3. The plan shall be used for work performed on MSFC NASA space flight products; qualification articles for space flight hardware; associated Ground Support Equipment (GSE), designated special test equipment, development hardware as specified by applicable project/quality plans, engineering technical support, and other NASA/NASA Prime Contractor customer requested quality assurance support as specified in Customer Agreements with associated MSFC/customer quality assurance requirements, or direct Requests for Proposals (RFQ's) or subsequent contracts with documented NASA/delegated Agency quality assurance requirements. It also is written to support quality assurance activities for other customers as allowed by contract.

QD40, Safety, Reliability, & Quality Assurance (SR&QA) Policy & Assessment Department, Manufacturing & Test Assurance Team, and supporting inspection personnel from the S&MA Mission Services Contractor are responsible for performing Government inspection and test monitoring as specified in this document and the contract.

Detailed surveillance requirements are contained below in this document consisting of 2 parts, quality assurance surveillance at the contract level and task level. Both of which include support from the contractor in the functional performance of this plan.

- Part A covers the general surveillance of the Contractors quality management system and its performance.

- Part B covers the NASA MSFC quality assurance oversight activities performed for MSFC NASA, other NASA Centers, and NASA Prime Contractors work requested in the performance of NASA specific work under the specified Task Agreement.

This plan is being submitted to the Contractor to enable them to structure their quality planning requirements associated with procured manufacturing, integration, and technical support activities.

Part A

General NASA Contract Quality Management System Monitoring and Surveillance

The following is the surveillance process that the S&MA Representative (SMAR) will perform to assure that the contractor has performed under the contracted quality management system process required by the contract, and/or specified by COTR, and in support of the contractual monitoring process. Any specific quality requirements required by a task agreement will be submitted through the task agreement process by the program/project quality engineering representative.

2a. The MSFC NASA MSFC S&MA Contract Lead Directorate Representative shall be designated as the "S&MA Representative" (SMAR). Primary and Alternate personnel contact information:

Primary:	Alternate**:**
QD40/Vic Scheuplein	QD40/Ken Crane
Phone: 256-544-7390	Phone: 256-544-8025
Fax: 256-544-4857	Fax: 256-544-4155
Pager: 800-946-4646/Pin1457383	Alt Phone: 256-544-8414
Email: vic.scheuplein@nasa.gov	Email: ken.crane@nasa.gov
Location: Building 4203/Room 2150	Location: Building 4203/Room 2233

1. The contractor shall submit a report monthly to the SMAR of all nonconformities initiated by the contractor. The report shall state whether they are minor or major nonconformances. The report shall list all opened, in-process, and closed nonconformance's and corrective/preventative actions taken. The nonconformance report listing section shall contain the document number, part/assembly number and/or system requirement, reason for the nonconformance, did NASA find the nonconformance, resolution, date of initiation, and if closed the date of closure. The corrective action listing section shall contain the document number, the related nonconformance, the root cause of the nonconformity, the required corrective actions, and the results of actions taken to insure they were effective.

2. The SMAR shall review the training records of the contractor every 6 months to review the competency maintenance of personnel that affect deliverable products and technical support.

3. The SMAR shall review the internal audit reports every 6 months to review the effective implementation and maintenance of the contractor's quality management system.

4. The SMAR shall review the contractor management review records to assess the continuing suitability, adequacy, and effectiveness of the contractor's management review process associated with the overall implemented quality management system.

5. The SMAR shall assure that the contractor is evaluated against their documented quality management system as required in MWI 5330.1. If the SMAR is not administrating the evaluation process then he shall be participating as a team member or observer.

Part B Task Agreement Specific

B1. Fabrication/Integration Task Order - NASA, NASA Prime Contractor, NASA Subcontractor Inspection and Validation Support Process Requirements

1. General, the SMAR will be responsible for overall contractor compliancy evaluation qualification and maintenance of the contractors contract and task specified quality management system processes as specified in WBS 2.4. For the Fabrication/Integration Task Agreement, Quality assurance activities noted within this document are defined as quality sensitive (See Section 3). All other activities not to be verified by the MSFC NASA Safety and Mission Assurance Directorate are considered non-quality sensitive and will be performed and accepted by the requesting organization through the Contracting Officer Technical Representative (COTR).

2. Program/Project Quality Representatives as specified herein will be either NASA and/or authorized Government Agency/Quality Assurance Support Contractor personnel.

3. Definitions:

a. Non-Quality Sensitive. A term used to identify equipment, hardware, software, or material not directly related to flight systems (e.g., mock-up, development hardware and software, industrial machinery, laboratory equipment). Hardware or software procured for development activities is non-quality sensitive unless the data resulting from development activities will be used in the "justification for qualification" of flight hardware, software, or flight-associated hardware. These items are inspected and test verified by the Process Operator (PO) or Testing Organization (TO), not by the NASA MSFC Safety and Mission Assurance Directorate. (MPR 8730.1)

b. Quality Sensitive. A term used to identify inspection and test verification by the Safety and Mission Assurance Directorate for flight hardware, flight software, and flight-associated ground support equipment and special test equipment; deliverable products that are to be assembled into a launch vehicle and associated equipment for testing, handling, launching, servicing, and maintaining a vehicle in space; qualification and re-qualification hardware; and hardware or software procured for development activities when the data resulting from development activities will be used in the "justification for qualification" of flight hardware, software, or flight-associated hardware. Hardware to be used in a hazardous operation may also be designated as quality sensitive by the responsible organization. (MPR 8730.1)

4. References:

a. NASA standards can be found at the following Internet link:
http://nodis3.gsfc.nasa.gov/

b. MSFC Quality Management System documents referenced in this document (NPR 8735.2; MPR 8730.1, "Inspection and Testing"; MPR 8730.3, "Control of Nonconforming Product"; MWI 5330.1, "Evaluation/Audits of Contractors, Suppliers, and Vendors; QD-QA-015, "Special Process Audits") can be found at the following Internet link:
https://webpub.nis.nasa.gov/directives/directives.htm

c. (b)(4) - SLI Quality Requirements, Quality Sensitive, 04/23/03 an

d. (b)(4) - SLI Quality Requirements, Non-Quality Sensitive, 04/23/03 and/or latest revision.

Note: *These specific* (b)(4) *documents referenced above are only used due to current contractual requirements. The Contractor shall transition these referenced documents within 120 days of Authority to Proceed date.*

5. The contractor will submit to the S&MA Representative for review during procurement processing informal copies of all purchase orders from NASA all Prime Contractors, Government Agencies, and other customers.

6. Program/Project Quality Representatives shall submit all Government Mandatory Inspection Points (GMIP's), including the use of proposed contractor default quality requirements as noted in section 4 of this document, to the responsible planning personnel designated by the COTR, documented and signed by the Program/Project Quality Representative, as part of the work request process for all applicable contractor quality sensitive in-process product processing. MSFC NASA Mandatory Inspection Points to be added to all applicable work authorizing documents to be performed under this plan for in-process work and testing when transferred to NASA are enclosed within this section.

7. The QD40, Manufacturing and Test Assurance Team will have responsibilities for the performance of surveillance activities for NASA MSFC including the verification of Government & NASA Mandatory Inspection Points, based upon approved quality planning requirements, and the final acceptance of deliverable products as specified herein. QD40 S&MA Mission Service Support Contractor personnel may be utilized to perform inspections on hardware produced under this contract but will not be allowed to make final product acceptance.

Quality Assurance Team Representative Contact Information:

Lead: QD40/Shirley Blair
Phone: 256-544-5607
Fax: 256-544-3241
Email: Shirley.blair@nasa.gov
Pager: 544-1183, #0710
Location: Building 4705/Room A111B

Alternate: QD40/Darlene Hill
Phone: 256-544-2253
Fax: 256-544-3241
Email: Diana.d.hill@nasa.gov
Pager: 544-1183, #0711
Location: Building 4705/Room A111C

The QD40 Manufacturing and Test Assurance Team and/or the assigned S&MA Mission Services Contractor inspectors as specified by the NASA will perform contractor Government Mandatory Inspection Point (GMIP) & NASA Mandatory Inspection Points (NMIP) inspection processing. S&MA will assure that inspection and test monitoring personnel including their S&MA Mission Services Contractor are certified or qualified to perform the special process activities in accordance with the standards and specifications documented in contract section 2.4.

Pre-defined work order NASA Mandatory Inspection Points (NMIP's). The following mandatory inspection points shall be placed on all quality sensitive work orders that will require transfer to NASA for processing:

1. Leak/proof testing using hydrostatic/gaseous pressure methods
2. Crane or forklift moves of PCH classified hardware (hand carries are not included)
3. In-process environmental testing
4. Nondestructive Evaluation (NDE), if not performed by the (EI 41) contractor
5. Electrical/functional testing and bonding checks

All additional inspection and NASA processing mandatory inspection points required by Program/Project Quality Representatives or the QD40 Manufacturing and Test Assurance Team shall be requested through the SMAR through to the COTR to evaluate the impact on contract delivery and/or inclusion into this plan as a GMIP. Minor changes to mandatory inspection points such as spelling, grammar, and changes that do not impact the delivery of the product and would not require configuration changes to the product, can be updated without COTR concurrence. The contractor shall route informational copies of orders containing GMIP and NMIP hold points to the QD40 Manufacturing and Test Assurance Team representatives prior to or concurrent with release for manufacture. QD40 Manufacturing and Test Assurance Team representatives shall review for proper GMIP & NMIP sequencing in the workflow.

GMIP processing nonconformances. Any product nonconformances found by the QD40 Manufacturing and Test Assurance Team, except during acceptance testing, will require the contractor to initiate his nonconformance system to resolve the nonconformity(ies) found. The contractor shall document that NASA found the nonconformity. For all test related anomalies/failures, the QD40 Manufacturing and Test Assurance Team shall initiate a NASA MSFC Test Discrepancy Record (TDR) and if necessary a Discrepancy Record (DR) as specified in MPR 8730.3 (See item B.8 below).

The QD40 Manufacturing and Test Assurance Team will be performing MSFC Organizational Instruction Process Audits to the requirements of QD-QA-015. Manufacturing and Test Assurance Team (QD40) and/or including their Mission Service Support Contractor personnel will be responsible to perform these audits. Process audits performed in conjunction with quality assurance inspection and monitoring activities shall be performed directly on a non-interference basis. Any nonconformance documentation generated by the audit process shall be processed as a contractor customer complaint process using as applicable their nonconformance and/or corrective/preventative action system process.

The QD40 Manufacturing and Test Assurance Team, Government personnel (whom may be supported by the Mission Services Support Contractor (NNM07AA74C) personnel who are limited to the review of the hardware and Acceptance Data Package (ADP)), shall perform final Government acceptance for all quality sensitive end item deliverables submitted under this contract by signing the DD250. Acceptance shall be made as specified in Section E in the contract with the required ADP as specified in the contract. Nonconformance's found by NASA during final acceptance will be documented on a NASA MSFC nonconformance report. The contractor shall respond to the NASA nonconformance report as to its validity. If they accept the nonconformance as an issue with final delivery, they will use their quality management system to resolve the nonconformance and resubmit the product to NASA for continued processing. If the

contractor does not consider the NASA nonconformance report as valid, they shall document it using their corrective action process back through the COTR to NASA.

The SMAR, Program/Project Quality Representatives, and QD40 personnel will all be available to provide technical guidance and assistance to assure full implementation of NASA Contractual QA requirements.

QD40 Manufacturing and Test Assurance Team, the COTR, and the Contractor quality lead will be notified by Email when the Primary SMAR is not available in which case the Alternate Contact or other designated NASA QA representative as defined by the Manager of the SR&QA Policy and Assessment Department (QD40) will be delegated responsibility for technical guidance and assistance associated with this plan.

8. NASA in-process testing and/or integration nonconformances. NASA MSFC shall document all product nonconformities as specified in MPR 8730.3. Those nonconformities dispositioned as, “caused by the contractor” (to include “use-as-is”, waiver/deviation, or re-grade) and/or returned to the contractor (“Returned to Vendor”) for rework, repair, or scrap shall be processed by the contractor using their customer complaint process and as applicable their nonconformance and corrective/preventative action process system. The contractor shall respond to the NASA nonconformance report as to its validity. If the Contractor accepts the nonconformance as an issue with their product responsibilities, they will use their quality management system to resolve the nonconformance and resubmit the product to NASA for continued processing. If the contractor does not consider the NASA nonconformance report as valid, they shall document it using their corrective action process back through the COTR to NASA.

9. Products identified as non-quality sensitive will be accepted by the requesting organizations through the requirements set forth in the contract Section E.