

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. CONTRACT ID CODE 07	PAGE OF PAGES 1 / 39
		2. AMENDMENT/MODIFICATION NO. 33	3. EFFECTIVE DATE June 30, 2005
4. REQUISITION/PURCHASE REQ. NO. N/A		5. PROJECT NO. (If applicable)	
6. ISSUED BY Procurement Office George C. Marshall Space Flight Center National Aeronautics and Space Administration Marshall Space Flight Center, AL 35812	CODE PS22E/MCE	7. ADMINISTERED BY (If other than Item 6) Procurement Office/PS22C George C. Marshall Space Flight Center National Aeronautics and Space Administration Marshall Space Flight Center, AL 35812 Lizette.M.Kummer@NASA.gov/256-544-3457	CODE PS22E/MCE

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State, and Zip Code) COLSA Corporation 6726 Odyssey Drive Huntsville, AL 35802 Attn: Pat Hodges TIN# 63-0798322 Code 4U825 FACILITY CODE	(v)	9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
	X	10A. MODIFICATION OF CONTRACT/ORDER NO. NNM04AA07C
		10B. DATED (SEE ITEM 13) December 4, 2003

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

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

12. ACCOUNTING AND APPROPRIATION DATA (If required)
N/A

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

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b). FAR 52.232-22 LIMITATION OF FUNDS
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 43.103(a) & FAR 52.232-2 CHANGES -COST REIMBURSEMENT
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return 3 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)							
	Negotiated Est. Cost	Maximum Award Fee	Unearned Award Fee	Maximum Incentive Fee	Unearned Incentive Fee	Contract Value	Total Sum Allotted
Previous	\$ 64,975,420	\$ 2,605,054	(\$54,563)	\$ 1,402,722	-0-	\$ 68,928,633	\$ 44,110,022
This Mod	<u>880,396</u>	<u>45,208</u>	<u>-0-</u>	<u>24,343</u>	<u>-0-</u>	<u>949,947</u>	<u>-0-</u>
New Total	\$ 65,855,816	\$ 2,650,262	(\$54,563)	\$ 1,427,065	-0-	\$ 69,878,580	\$ 44,110,022

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Marty B. Hanson Contracting Officer	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY <u>Original Signed by</u> (Signature of Contracting Officer)	16C. DATE SIGNED June 30, 2005

Standard Form 30 Continued

1. The purpose of this modification is to implement CBD HM3-00-3127 change number ECR-HOSC 4-030 to add the Enhanced HOSC System Payload Data Services System, Integrated Change Out (EPIC) into the existing Performance Work Statement and to implement the negotiated equitable adjustment therefore. This effort will be performed in three Phases: Phase I- Installation, Phase II- EPIC Sustaining, and Phase III, EHS 8.x Sustaining. The necessity for proceeding with Phase III, will be evaluated during Phase II. Should the Government determine that the work is not needed at that time, Phase III will be deleted from this contract in accordance with the following clause that is hereby incorporated into Section H, Special Contract Requirements:

“H. 12 PHASE III- EPIC

Prior to July 1, 2005, the Contracting Officer may issue, pursuant to this clause, a unilateral modification to delete the requirements for Phase III of the EPIC effort at a reduction of \$288,755 in estimated cost, \$14,828 in the maximum award fee, and \$7,984 in maximum incentive, respectively. The contractor shall not proceed with work on Phase III until July 1, 2005 without written authorization from the Contracting Officer.”

2. A breakout of the negotiated cost and fee adjustments for performance of the EPIC effort by contract period are shown below:

	<u>BASIC PERIOD</u>	<u>OPTION 1</u>	<u>OPTION 2</u>	<u>TOTAL</u>
Estimated Cost	\$ 880,396	\$ 281,626	\$ 289,543	\$1,451,565
Fee	<u>69,551</u>	<u>22,248</u>	<u>22,874</u>	<u>114,673</u>
Total	\$ 949,947	\$ 303,874	\$ 312,417	\$1,566,238

<u>Basic Period</u>	<u>Estimated Cost</u>	<u>Maximum Award Fee</u>	<u>Maximum Incentive Fee</u>	<u>Total Minus Unearned Fees</u>
Previous	\$ 64,975,420	\$ 2,605,054	\$ 1,402,722	\$ 68,928,633
This Mod	<u>880,396</u>	<u>45,208</u>	<u>24,343</u>	<u>949,947</u>
New Amt	\$ 65,855,816	\$ 2,650,262	\$ 1,427,065	\$ 69,878,580

<u>Option 1</u>	<u>Estimated Cost</u>	<u>Maximum Award Fee</u>	<u>Maximum Incentive Fee</u>	<u>Total Minus Unearned Fees</u>
Previous	\$ 20,301,671	\$ 808,152	\$ 435,159	\$ 21,544,982
This Mod	<u>281,626</u>	<u>14,461</u>	<u>7,787</u>	<u>303,874</u>
New Amt	\$ 20,583,297	\$ 822,613	\$ 442,946	\$ 21,848,856

<u>Option 2</u>	<u>Estimated Cost</u>	<u>Maximum Award Fee</u>	<u>Maximum Incentive Fee</u>	<u>Total Minus Unearned Fees</u>
Previous	\$ 20,450,869	\$ 815,814	\$ 439,284	\$ 21,705,967
This Mod	<u>289,543</u>	<u>14,868</u>	<u>8,006</u>	<u>312,417</u>
New Amt	\$ 20,740,412	\$ 830,682	\$ 447,290	\$ 22,018,384

<u>Evaluation Period</u>		<u>Maximum Award Fee</u>			<u>Maximum Incentive</u>		
		<u>Previous</u>	<u>This Mod</u>	<u>New Amt</u>	<u>Previous</u>	<u>This Mod</u>	<u>New Amt</u>
01/01/04-06/30/04	1	\$485,012	-0-	\$485,012	\$208,928	-0-	\$208,928
07/01/04-12/01/04	2	\$480,581	-0-	\$480,581	\$269,221	-0-	\$269,221
01/01/05-06/30/05	3	\$413,881	\$15,565	\$429,446	\$233,305	\$8,381	\$241,686
07/01/05-12/31/05	4	\$413,881	\$15,565	\$429,446	\$233,305	\$8,381	\$241,686
01/01/06-06/30/06	5	\$405,850	\$7,039	\$412,889	\$228,982	\$3,790	\$232,772
07/01/06-12/31/06	6	\$405,849	\$7,039	\$412,888	\$228,981	\$3,791	\$232,772
01/01/07-06/30/07	7	\$404,076	\$7,230	\$411,306	\$217,580	\$3,893	\$221,473
07/01/07-12/31/07	8	\$404,076	\$7,231	\$411,307	\$217,579	\$3,894	\$221,473
1/01/08-06/30/08	9	\$407,907	\$7,434	\$415,341	\$219,642	\$4,003	\$223,645
07/01/08-12/31/08	10	<u>\$407,907</u>	<u>\$7,434</u>	<u>\$415,341</u>	<u>\$219,642</u>	<u>\$4,003</u>	<u>\$223,645</u>
		\$4,229,020	\$74,537	\$4,303,557	\$2,277,165	\$40,136	\$2,317,301

3. To effect this change, clause B.2 Estimated Cost, Award Fee And Performance Incentive Fee, is hereby deleted its entirety and the revised Clause B.2, shown on replacement Pages B-1 through B-2A, is substituted in lieu thereof.

4. Attachment J-1, Performance Work Statement, is hereby revised to incorporate the EPIC effort into WBS Section 3.2.2.3 –KSC Support and Section 4.7.4 KSC Operations and Maintenance Support.

To effect this change, the existing PWS has been re-paginated, pages J-1-6A and J-1-19A have been deleted, and their content replaced on pages J-1-7 and J-1-21 respectively. Therefore, pages J-1-1 through J-1-28 are hereby deleted in their entirety the replacement pages J-1-1 through J-1-32 are substituted in lieu thereof. As a consequence of this change, the pagination for Performance Work Statement in Part III-List of Documents, Exhibits and Other Attachments, is hereby updated, page J-1 is deleted in its entirety and the revised page J-1 is substituted in lieu thereof.

5. In order to reflect the changes resulting from this modification, the page(s) listed below are added or deleted from the contract as shown. In order to indicate the specific area(s) of change, vertical lines are shown in the right margin of the enclosed replacement page(s) across from the revised area(s).

<u>Section</u>	<u>Pages Added</u>	<u>Pages Deleted</u>
B, Supplies or Services and Prices/Costs	B-1 - B-2, B-2A, H-10 J-1 and J-1-1 – J-1-32	B-1 - B-2, B-2A, H-10 J-1 and J-1-1 – J-1-28

6. Contractor's Statement of Release

In consideration of the modification agreed to herein as complete equitable adjustment for the contractor's proposal for adjustment listed below, the contractor hereby releases the Government from any and all liability under this contract for further equitable adjustment attributable to such facts or circumstances giving rise to said contract changes and/or contractor proposals, and for such additional obligations as may be required by this modification.

Contract
Change Identification

Modification 33

Contractor
Proposal Number

Cost Quotation No. 04-11-164A/R3 dtd March 31, 2005

PART I - THE SCHEDULE

SECTION B - SUPPLIES OR SERVICES AND PRICE/COSTS

B.1 Supplies And/Or Services To Be Furnished

(a) In a manner consistent with the Marshall Space Flight Center (MSFC) values, the Contractor shall provide all resources (except as may be expressly stated in this contract as furnished by the Government) necessary for performing the "Huntsville Operations Support Center (HOSC)" in accordance with the Performance Work Statement, Attachment J-1.

(b) This is a cost-reimbursement contract with both award fee and performance incentive fee criteria (CPAF/IF). The award fee (subjective evaluation) and performance incentive fee (objective evaluation) will be assessed in accordance with the Fee Evaluation Plan (FEP), Attachment J-7.

(c) A portion of this contract is under an Indefinite Delivery/Indefinite Quantity (IDIQ) arrangement, which will also be on a CPAF/IF basis. The purpose of this provision is to allow the Government to acquire indefinite services as addressed in the Performance Work Statement, Attachment J-1, Paragraphs 3.0 and 4.0. IDIQ requirements cannot be adequately defined for inclusion in the contract because the precise quantities that will be required during the contract period of performance cannot be predetermined. IDIQ will be ordered in accordance with Clause B.7- Task Ordering Procedure and Clause B.8- IDIQ Schedule of Rates. The guaranteed minimum quantity of work that will be ordered under the IDIQ portion of this contract shall be \$50,000 per year. The maximum not-to-exceed (NTE) amount of IDIQ work per contract year is \$3,000,000 per contract year.

(End of Clause)

B.2 Estimated Cost, Award Fee And Performance Incentive Fee

(a) The estimated cost of this contract is \$65,855,816. The maximum award fee is \$2,650,262. The maximum performance incentive fee is \$1,427,065. The estimated cost plus maximum award fee and maximum performance incentive fee minus the unearned award fee and unearned performance incentive fee is \$69,878,580.

(b) A breakout of estimated cost, maximum award fee, unearned award fee, maximum performance incentive fee, unearned performance incentive fee, and the total minus unearned fee for the base contract period is shown below:

<u>Period Covered</u>	<u>Estimated Cost</u>	<u>Maximum Award Fee</u>	<u>Unearned Award Fee</u>	<u>Max. Perf. Incentive Fee</u>	<u>Unearned Performance Incentive Fee</u>	<u>Total Minus Unearned Fees</u>
1/1/04 - 12/31/06	\$65,855,816	\$2,650,262	\$54,563	\$1,427,065	\$-0-	\$69,878,580

(c) A breakout of estimated cost, maximum award fee, unearned award fee, maximum performance incentive fee, unearned performance incentive fee, and the total minus unearned fee is shown below for Option 1 and Option 2:

<u>Period Covered</u>	<u>Estimated Cost</u>	<u>Maximum Award Fee</u>	<u>Unearned Award Fee</u>	<u>Max. Perf. Incentive Fee</u>	<u>Unearned Perf. Incentive Fee</u>	<u>Total Minus Unearned Fees</u>
Option 1 (1/1/07 - 12/31/07)	\$20,583,297	\$822,613	TBD	\$442,946	TBD	\$21,848,856
Option 2 (1/1/08 - 12/31/08)	\$20,740,412	\$830,682	TBD	\$447,290	TBD	\$22,018,384

(d) The maximum award fee and maximum performance incentive fee for each of the contract periods specified above is hereby divided and allocated into individual six month evaluation periods during contract performance in order to calculate award and performance incentive fee earned.

<u>Evaluation Period</u>		<u>Maximum Award Fee</u>		<u>Maximum Incentive Fee</u>
January 1 - June 30, 2004	1	\$485,012	1	\$208,928
July 1 - December 31, 2004	2	\$480,581	2	\$269,221
January 1 - June 30, 2005	3	\$429,446	3	\$241,686
July 1 - December 31 2005	4	\$429,446	4	\$241,686
January 1 - June 30, 2006	5	\$412,889	5	\$232,772
July 1 - December 31, 2006	6	\$412,888	6	\$232,772
January 1 - June 30, 2007	7	\$411,306	7	\$221,473
July 1 - December 31, 2007	8	\$411,307	8	\$221,473
January 1 - June 30, 2008	9	\$415,341	9	\$223,645
July 1 - December 31, 2008	10	\$415,341	10	\$223,645
		<u>\$4,303,557</u>		<u>\$2,317,301</u>

(e) The amount of award fee which has been earned/unearned pursuant to this clause and the period to which said fee applies is set forth below:

<u>Award Fee Period</u>	<u>Amount Earned</u>	<u>Amount Unearned</u>
January 1 - June 30, 2004	\$ 456,881	\$ 28,131
July 1 - December 31, 2004	<u>\$ 454,149</u>	<u>\$ 26,432</u>
Total	\$ 911,030	\$54,563

(f) The amount of performance incentive fee which has been earned/unearned pursuant to this clause and the period to which said fee applies is set forth below:

<u>Incentive Fee Period</u>	<u>Amount Earned</u>	<u>Amount Unearned</u>
January 1 - June 30, 2004	\$ 208,928	\$-0-
July 1 - December 31, 2004	<u>\$ 269,221</u>	<u>\$-0-</u>
Total	\$ 478,149	\$-0-

(End of Clause)

B.3 Award Fee For Service Contracts (NFS 1852.216-76)(June 2000)

H. 11 Minimum Insurance Coverage. (NFS 1852.228-75) (OCT 1988)

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

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

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

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

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

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

(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)

H. 12 PHASE III- EPIC

Prior to July 1, 2005, the Contracting Officer may issue, pursuant to this clause, a unilateral modification to delete the requirements for Phase III of the EPIC effort at a reduction of \$288,755 in estimated cost, \$14,828 in the maximum award fee, and \$7,984 in maximum incentive, respectively. The contractor shall not proceed with work on Phase III until July 1, 2005, without written authorization from the Contracting Officer.

(End of clause)

PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS

SECTION J - LIST OF ATTACHMENTS

<u>Attachments</u>	<u>Title</u>	<u>Pages</u>
J-1	Performance Work Statement	32
J-2	Data Procurement Document	39
J-3	Applicable Regulations and Procedures	3
J-4	Acronyms and Abbreviations	11
J-5	Government Furnished Property	74
J-6	Work Breakdown Structure	2
J-7	Fee Evaluation Plans	6
J-8	Installation-Provided Property and Services	2
J-9	Performance Work Statement for IDIQ Task Order	1
J-10	SCA Wage Determination	10
J-11	Marshall Values	1

ATTACHMENT J-1**PERFORMANCE WORK STATEMENT (PWS)****1.0 General**

This Performance Work Statement is divided into four paragraphs. Paragraph 1.0 introduces the PWS and provides a background of the HOSC and its related facilities. Paragraph 2.0 describes all management functions required which are applied to the programs and projects supported by the HOSC. Paragraphs 3.0 and 4.0 describe the engineering and operations services, respectively, to be applied to the programs and projects supported by the HOSC.

The principal place of performance of these activities is Marshall Space Flight Center (MSFC) located in Huntsville, Alabama. MSFC is a tenant to the U.S. Army on Redstone Arsenal. The HOSC is located within building 4663, which is at the corner of Martin Road and Dodd Road. All operational activity is located in buildings 4663 and 4207, the HOSC annex. The contractor will be provided office and general engineering space, as required, within building 4663 or at other locations at MSFC.

The HOSC provides multi-program facilities, systems, and services, both local and remote, which support various mission phases of spacecraft payload and Shuttle propulsion systems operations. Programs currently supported by the HOSC include the Space Shuttle, the International Space Station (ISS), the Chandra X-Ray Observatory (CXO) and the MSFC Microgravity Telescience Support Center (TSC). The HOSC services are scalable to support additional programs.

The HOSC has the capability to support all phases of missions including planning, testing, simulations, pre-launch, launch, and all aspects of payload flight operations, as required by the various programs.

The contractor's mission is to provide Operations and Maintenance (O&M) and system development services to meet the requirements of the Flight Projects Directorate (FPD), Ground Systems Department (GSD) and its customers. The requirements defined in this PWS are for the HOSC and its related facilities and systems. Customers may be on-site, off-site, or at international locations.

The product-oriented development activities involved in this contract encompass all aspects of the entire life-cycle of ground systems development. Typical activities include: requirements definition, analysis and documentation; configuration management; systems, hardware, software and network engineering; technology transfer; and design, development, test, and delivery.

The service-oriented maintenance and operations activities include: sustaining engineering of developed systems at both local and remote locations; activity preparation and simulation; flight evaluation activities; hardware and software maintenance; systems

and facilities operations; data collection, processing, distribution, and archiving; validation and verification of data products and systems; and maintenance and operations of all systems.

For the purpose of this PWS, the customer is defined as the end-user of the services described. A GSD customer may be an organization such as a NASA program, project office, staff office, National Aeronautics and Space Administration (NASA) contractor, payload developer, school, international partner or an individual within these organizations.

2.0 Management

The overall contractor program management responsibilities for the services and functions addressed in this PWS are exercised through the contractor management structure. The contractor shall be responsible for implementing, managing, measuring, and participating, in all internal and external processes necessary for the adequate execution of the activities described in this PWS. The contractor shall be governed by the processes defined within the Marshall Management System and the cited NASA Policy Directives (NPDs), NASA Procedures and Guidelines (NPGs), Marshall Policy Directives (MPDs), Marshall Procedures and Guidelines (MPGs), Marshall Work Instructions (MWIs), and the Flight Projects Directorate (FPD) Organizational Issuances (OIs). The Marshall Management System is documented in MPD1280.1, Marshall Management Manual.

The Marshall Space Flight Center's commitment to Safety, Quality, and Management by Core Values is the foundation for the MSFC culture. The contractor is expected to embrace, and operate within, these values while performing the work defined in this PWS. As a result of this commitment, Marshall has established and manages by a MSFC Safety, Health, and Environmental (SHE) Policy, a Quality Policy, and the Core Values of People, Customers, Excellence, Teamwork, and Innovation. Further definition of the Core Values is contained in Attachment J-11, Marshall Values.

The MSFC SHE Policy, is:

SAFETY: MSFC will strive to prevent human injury and occupational illnesses and ensure safety for all operations and products.

HEALTH: It is MSFC's policy to promote and maintain the physical and mental well-being of its employees.

ENVIRONMENTAL: MSFC will strive to protect, preserve, and enhance the quality of the environment while conducting their primary mission activities.

The Marshall Quality Policy is to provide quality products and services to our customers through the Marshall values: people, customers, excellence, teamwork, and innovation.

2.1 Contract Management

The contractor shall provide, implement and maintain the requisite organization, disciplines and systems necessary to manage the personnel and resources required for the performance of these functions. These functions shall be applied to the HOSC programs and projects commensurate to the level and complexity of activity. These management services shall be applied to the programmatic requirements of MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan.

The contractor shall ensure that HOSC and related facilities capabilities and configurations fully support mission operations and development objectives in accordance with the HOSC-PLAN-623, HOSC Project Plan. The contractor shall develop, implement, maintain and operate systems for planning, scheduling, controlling and reporting all HOSC services and functions and for analyzing and reporting contract performance. In performance of program management, the contractor shall:

- a. Prepare and maintain a Management Plan for the contracted effort in accordance with DRD 1016MA-001, Management Plan.
- b. Prepare and maintain locality information listing, including number of personnel on-site and their designated location. The list shall include information in accordance with DRD 1016CD-002, Employee Location Listing.
- c. Develop and maintain project, system, and facility schedules and staffing plans.
- d. Prepare and submit for approval, as required, status reports, metrics data, documentation, etc. as required by DRD 1016MA-003, Progress Reports.
- e. Provide necessary software and system development tools including hardware necessary to provide cost efficient development and operations.
- f. Provide training of personnel supporting HOSC mission operations in accordance with HOSC-PLAN-209, Integrated Support Team (IST) Training Plan. These activities shall ensure the technical competence of personnel assigned to mission support positions and their ability to perform in a mission support environment. The contractor shall provide training in support of engineering and software design and development activities.
- g. Provide, implement, and maintain adequate controls including contractor policies and procedures governing standards of conduct, procurement processes and practices, and prevention of waste, fraud, and mismanagement.
- h. Provide for travel to complete assigned tasks. The contractor shall provide for travel to attend training classes, to provide off-site system support, to participate in analysis at other facilities and in support of other engineering, design and development activities at remote sites.

The overall MSFC program management responsibilities for the services and functions addressed in this PWS are exercised through the established responsibility and authority of the Contracting Officer and the Contracting Officer's Technical Representative (COTR).

2.2 Business Management

The contractor shall provide all aspects of business management to this contract. These include finance, personnel, clerical and planning. The contractor shall prepare, implement, and maintain a Work Breakdown Structure and Dictionary in accordance with DRD 1016MA-004, Work Breakdown Structure and Dictionary. The contractor shall provide planning, tracking, accumulating and reporting contract costs and provide other financial support required to meet the budgeting, cost reporting, billing and disclosure requirements of the contract in accordance with NPG 9501.2, NASA Contractor Financial Management Reporting. In performance of this function, the contractor shall provide, implement and maintain a cost accounting system. The system shall be fully integrated and shall provide status of committed, obligated, costed, and disbursed funds. The contractor shall provide projections and tracking of negotiated and accrued costs, and labor hours by NASA Financial Classification System. The contractor shall prepare inputs for program/project budget cycles and processes and prepare and submit Financial Management Reports in accordance with DRD 1016MA-002. The contractor shall provide cost analysis and assessments in support of all activities of the PWS.

2.3 Procurement

The contractor shall provide the equipment, software, upgrades, tools and materials, not otherwise furnished by the government, necessary to complete assigned tasks, in support of HOSC operations and development. In performance of procurement functions, the contractor shall provide all aspects of the procurement processes in compliance with applicable Federal Acquisition Regulations (FAR) and NASA FAR supplements (NFS). The contractor shall provide all supplies and services not otherwise furnished by the government.

The contractor shall provide status of individual procurements and purchase orders. The contractor shall provide purchase planning in accordance with FPD-OI-FD40.11, Ground Systems Department Purchasing Planning.

2.4 Property Management and Coordination

The contractor shall perform property management and administration of all property acquired by, or in possession of, the contractor and subcontractors including Government Furnished Property (GFP) in accordance with MPG 4000.2 MSFC Property Management. The contractor shall coordinate and comply with all MSFC property rules and regulations to include audits and inventories. In performance of this function, the contractor shall prepare and maintain a report identifying and listing 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. This report shall be prepared and maintained in accordance with DRD 1016LS-001, Government Property Management Plan and provide logistics functions, such as packing and preparation for

shipping equipment for repair and relocating equipment to its installation point in compliance with MSFC property regulations. The contractor shall coordinate all property management functions with the cognizant MSFC property management organization.

2.5 IT Security and Export Control

The contractor shall provide for the collection, formulation and analysis of security requirements and the development of security plans and procedures for all systems used in the HOSC to include internal and external interfaces and networks. The contractor shall perform facility, system and personnel security in accordance with the rules, regulations, and requirements defined in NPG 2810.1 Security of Information Technology, MPD 2810.1 IT Security, and MSFC-RQMT-2467 HOSC Information Technology Security Requirements. The contractor shall prepare and maintain an Information Technology Security Plan that documents how the contractor and subcontractor personnel will utilize, in a secure manner commensurate with sensitivity of the information involved, those Federal computer systems and software applications managed by others. The contractor shall prepare a system-level Information Technology System Security Plan for each Federal general support computer system and major software application managed by contractor and subcontractor personnel in the performance of this contract. The security plan(s) shall be based on an assessment of risks, and document the safeguards necessary to ensure sufficient electronic information availability, integrity, and confidentiality, as required by NPG 2810.1. The contractor shall prepare the Information Technology Security Plan(s) in accordance with DRD 1016CD-001. The contractor shall provide Federal Information Processing (FIP) resource protection, personnel security, facility access procedures, policies and protection and the safeguarding of Privacy Act Information and proprietary data. In performance of this function, the contractor shall define and implement the Information Technology Security (ITS) plans, procedures and functions for each HOSC system necessary to provide protection of the information systems commensurate with the criticality level of the systems, applications, and data content. Also in performance of this function, the contractor shall receive, review and apply all applicable security alerts/patches for the systems in the HOSC.

Requirements for vulnerability scans on all existing and new systems connected to the HOSC networks using NASA provided software as determined by the MSFC IT Security Team are included in PWS paragraph 4.4.5, System Administration and Management.

The contractor shall coordinate IT Security Training for all the contractor employees as required by NASA/MSFC.

The contractor shall support disaster preparedness and recovery in accordance with MSFC-PLAN-2934, HOSC Emergency & Disaster Recovery Plan (EDRP). In addition, the contractor shall provide support for security incidents, internal and external audits and investigations, assessments and analysis.

The contractor shall maintain an Export Control Program in accordance with applicable government and NASA regulations, and with the policies set forth in MPD2190.1 and MPG 2190.1, MSFC Export Control Program. This Program shall include: identification of candidate exports; classification of candidate exports; identification of candidate license exceptions and exemptions; request of an export license, if required; and maintenance of records of export activities. The status of the contractor's export control activities shall be reported, as required, in routine written and oral reports.

In addition to any other requirements of this contract, all individuals who perform tasks as a system administrator or have authority to perform tasks normally performed by system administrator shall be required to demonstrate knowledge appropriate to those tasks.

This demonstration, referred to as the NASA System Administrator Security Certification, is a NASA funded two-tier assessment to verify that system administrators are able to –

1. Demonstrate knowledge in system administration for the operating systems for which they have responsibility.
2. Demonstrate knowledge in the understanding and application of Network and Internet Security.

Certification is granted upon achieving a score above the certification level on both an Operating System test and the Network and Internet Security Test. The Certification earned under this process will be valid for three years. The criteria for this skills assessment has been established by the NASA Chief Information Officer. The objectives and procedures for this certification can be obtained by contacting the IT Security Awareness and Training Center at (216) 433-2063.

A system administrator is one who provides IT services, network services, files storage, web services, etc. to someone else other than themselves and takes or assumes the responsibility for the security and administrative controls of that service or machine. A lead system administrator has responsibility for information technology security (ITS) for multiple computers or network devices represented within a system; ensuring all devices assigned to them are kept in a secure configuration (patched/mitigated); and ensuring that all other system administrators under their lead understand and perform ITS duties. An individual that has full access or arbitrate rights on a system or machine that is only servicing themselves does not constitute a "system administrator" since they are only providing or accepting responsibility for their system. An individual that is only servicing themselves is not required to obtain a System Administrator Certification.”

2.6 Risk Management

The contractor shall implement a continuous risk management program for systems developments, operations and business following standard industry practices. Risks and t

2.7 Safety Program

The contractor shall establish and implement an industrial safety, health and environmental program and provide an On-Site Safety and Health Plan in accordance with DRD 1016SA-001. The contractor's industrial safety, health, and environmental program shall incorporate the following Safety and Health Program Core Process Requirement (CPR) elements documented in MPG 8715.1, Marshall Safety, Health, and Environmental (SHE) Program:

- a. Management commitment and employee involvement in the safety and health program.
- b. System and worksite hazard analysis.
- c. Hazard prevention and control.
- d. Safety and health training.
- e. Environmental compliance.

The contractor shall report mishaps and safety statistics to the MSFC Safety and Mission Assurance (S&MA) Office in accordance with DRD 1016SA-002.

2.8 Quality Management

The contractor shall establish, implement, and maintain quality assurance as a means of ensuring that products and services conform to specific requirements. The contractor shall provide quality management in accordance with HOSC-PLAN-661, HOSC Quality Plan.

2.9 Configuration Management (CM)

The contractor shall provide Configuration Management functions in accordance with MSFC-PLAN-2929, HOSC Configuration Management Plan. The contractor shall provide CM services to include configuration identification, change control management, and maintenance of the existing documents and software libraries under HOSC Management Control Group (HMCG) CM control as well as the management and performance of configuration audits. The contractor shall define in DRD 1016CM-001, Configuration Management Plan, the process for managing internal contractor documentation compatible with MSFC-PLAN-2929.

2.9.1 Hardware Systems

In performance of the hardware systems CM, the contractor shall ensure version control and definition and provide trace ability of version history. The contractor shall maintain, and improve as necessary, configuration control of the hardware supporting development or mission operations.

2.9.2 Software Systems

The contractor shall maintain, and improve as necessary, configuration control of the software and systems under development as well as those supporting HOSC mission operations. The contractor shall prepare software builds for integrated development testing and for delivery, and provide accessibility control, traceability of build and version history, and definition control of executable operational configurations. The contractor shall ensure that technology transfer and export documentation, rules, and regulations have been completed for each version of software and deliveries in with NASA and MSFC policies.

2.9.3 Data Management

The contractor shall provide data management services to include document, data, and library management, status accounting, database management and maintenance, change board administrative services and configuration of HOSC websites in accordance with MSFC-PLAN-3046, HOSC Data Management Plan.

2.9.4 Facilities

The contractor shall provide CM for the floor plans and other physical configuration data as described in paragraph 4.6 Facilities using the HOSC Configuration Request (HCR) process, as defined in FPD-OI-FD43.2, HOSC Configuration Request, as the principal CM tool. With Level 3 documentation, (such as the MSFC-PLAN-904 Volume 2, HOSC Functional Requirements and Implementation Plan System Configuration is impacted) the Engineering Change Request (ECR) process as defined in HOSC-PLAN-2929, HOSC Configuration Management Plan shall be utilized.

2.10 Documentation Support

The contractor shall maintain, and augment as necessary, the documentation required to support all aspects of the activity under this PWS. Documentation shall be prepared in accordance with MSFC-STD-555, MSFC Engineering Documentation Standard, where

applicable. Additionally, presentation services as requested shall be provided. The contractor shall provide plan and procedure development and supporting documentation for delivered and updated systems.

The contractor shall manage and coordinate changes to new or existing Memorandums of Understanding (MOU), Interface Control Documents (ICD) and any other documents that define interfaces between the HOSC and external entities. The contractor shall provide document maintenance and development services for all documents maintained by the HOSC.

2.11 Electronic and Information Technology Accessibility

Development and maintenance activities executed under this contract shall comply with the Federal Acquisition Circular 97-27, Electronic and Information Technology (EIT) Accessibility, Section 508 of the Rehabilitation Act of 1973 by implementing the applicable Technical Standards (Subpart B) on a case by case manner, where covered electronic and information technology be capable of having accessibility devices added at some later time, as necessary. The Desktop and Portable Computers (1194.26) Technical Standard of Section 508 shall apply.

2.12 Training and Certification

The contractor shall provide training of all personnel supporting HOSC mission operations in accordance with HOSC-PLAN-209, Integrated Support Team (IST) Training Plan. These activities shall ensure the technical competence of personnel assigned to mission support positions and their ability to perform in a mission support environment. The contractor shall provide training in support of engineering and software design and development activities.

2.13 Program Vision and Leadership

Consistent with its commitment to Management by Core Values, the Marshall Space Flight Center is committed to the continual improvement of its processes, practices, and products. The contractor is expected to embrace this commitment, and provide the program vision and leadership required to ensure the proper focus on continual improvement and innovation. This includes innovations in management, resulting in process improvements or enhanced customer service, as well as technical innovations, resulting in increased quality or reliability of the HOSC facilities and systems. All continual improvement initiatives related to the work in this PWS shall be documented in the Ground Systems Department (FD40) Continual Improvement database.

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 1016CD-003.

2.14 Indefinite Delivery/Indefinite Quantity (IDIQ)

General IDIQ activities cannot be defined in advance because of the ever-changing requirements of the Center and the programs and projects supported. The level of these activities is expected to fluctuate as requirements are identified and funded. The Government will identify specific engineering, O&M, and other project-specific tasks, related to appropriate Performance Work Statement elements and respective funding limitations on a case-by-case basis.

3.0 Engineering

The contractor shall develop operations concepts, systems concepts, system-level requirements, and designs for hardware, software, external interfaces, internal interfaces and operations. The contractor shall perform system requirements development, system analysis, systems integration and planning and sustaining engineering. The contractor shall develop system and software designs and provide design review support for all approved HOSC project requirements. These activities shall be performed for upgrades to existing systems, new requirements for existing systems, mission-specific requirements and new programs for HOSC systems. The contractor shall review and assess the future direction of developments to take advantage of technical innovations that would result in increased quality, reliability or customer satisfaction for the HOSC facilities and systems.

The contractor shall prepare metrics data, status reports, management reports, analysis data and other reports and data. The contractor shall support meetings as required.

3.1 Engineering and Integration

Engineering capabilities for the HOSC contract include Systems Engineering, Software Engineering, Hardware Engineering, and Network Engineering, as well as Independent Verification and Validation. Paragraphs 3.1.1 through 3.1.5 describe the specific functions to be performed for each of these engineering elements. The actual performance of these engineering functions for each unique project is included in the project-unique requirements in Paragraphs 3.2 through 3.5.

The contractor shall develop and maintain a set of common engineering processes, procedures, and standards to be applied to HOSC projects.

The contractor shall develop the approach for systems engineering, integration, and development and report it in accordance with DRD 1016SE-001, System Development Plan.

3.1.1 Systems Engineering

The contractor shall perform engineering integration across all HOSC projects, to ensure the integrity and compatibility of the overall HOSC architecture. The contractor shall ensure that new projects and capabilities are effectively integrated into the existing HOSC architecture.

For Systems Engineering, the contractor shall provide the capabilities to perform the following functions:

- a. Ensure that HOSC and related facilities capabilities and configurations fully support mission operations and development objectives. Assess all HOSC related engineering change requests, maintain a current assessment of all open work on HOSC and related systems, provide systems coordination for external facilities utilizing HOSC components and architectures and maintain an official interface with HOSC customer organizations.
- b. At the systems level, develop and maintain system requirements documentation and Interface Control Documents (ICD). Perform technical analysis and assessments, hardware and software integration and testing, system change management, performance analysis, modeling and testing to ensure compliance with specifications and overall system performance. This includes the assessment of other documents that impact HOSC services and products. Participate in the CM process associated with these documents, as required, assessing impact to the HOSC products as part of the review process for these documents.
- c. Provide change package engineering services for all items requiring change board approval. These services include but are not limited to providing ECR assessment and presentation to the HOSC Management Coordination Group (HMCG) Board and providing HOSC Problem Report (HPR) assessment and resolution at the applicable HPR review board. These services shall be in accordance with the ECR process documented in MSFC-PLAN-2929, and the HPR process documented in FPD-OI-FD40.10.
- d. Define integrated system architectures and designs to meet all system requirements, and incorporate Government Furnished Property (GFP) components into system architectures and designs, when applicable.
- e. Perform system analyses, trade studies and assessments to determine options and recommendations for system capabilities, design and development.

- f. Determine system functional element interrelationships and interactions, predict system performance and compare competing design alternatives.
- g. Investigate vendor products and summarize options for make-or-buy.
- h. Perform risk assessments and define risk mitigation processes.
- i. Assess the potential usefulness of technological advances in improving efficiency and/or reducing cost.
- j. Develop and maintain hardware specifications, and develop and conduct engineering acceptance tests as required.
- k. Develop comprehensive system acquisition specifications and documents for end items and products that are to be acquired from manufacturers or vendors.
- l. Conduct system performance studies, recommending appropriate changes to eliminate potential system bottlenecks, resource conflicts and system overloads.
- m. Maintain knowledge on new and existing technologies relevant to the HOSC systems and operations.

3.1.2 Software Engineering

The contractor shall establish, implement, and maintain a Software Quality Assurance Program and provide a plan in accordance with DRD 1016QE-001, Software Quality Assurance Plan.

For Software Engineering, the contractor shall provide the capabilities to perform the following functions:

- a. Define and analyze detailed requirements, conduct software design and coding, conduct testing, validation and verification.
- b. Provide software cost estimation, risk analysis and life cycle analysis for new software application development.
- c. Provide sustaining engineering for all operational systems. Provide maintenance builds for flight support, for COTS upgrades, for technology upgrades, and for necessary upgrades due to COTS deficiencies. Perform software design and development to support changing ICDs, changing vehicle requirements, problems encountered during flight, and external changes to the requirements.

- d. Perform design and development activities for upgrades to existing systems, mission specific requirements, and new programs to be supported by the facilities. Deliver maintenance software builds and new software builds as specified in the build definition for each project, and be responsible for the installation and integration of developed, procured or provided systems within the facility. Perform build management functions for software deliveries to include determination of build content and schedules, and maintenance of the build definition. Build content shall be based on ECR assessment at the HOSC Management Coordination Group (HMCG) Board and upon HOSC Problem Report (HPR) assessment at the applicable HPR review board.
- e. Provide administrative support to software integration build and test activities, such as cataloging internal problem reports and code check-in documents and preparing documentation that accompanies a delivered build. Provide resource management of the computer hardware and software used by the software engineering organization for developmental integration and test and for making software builds. Establish architectures for development activities, for developmental integration and test activities and for software build activities. Prepare architectural diagrams of the development, test and integration environments.
- f. Incorporate GFP components into all system software designs, integrate and test newly developed software components with existing components, develop software prototypes required for system design or capability analysis, and ensure improvements do not adversely affect ongoing operations.
- g. Provide fault isolation, determination and analysis, and identify proposed changes.
- h. Perform software test and integration to ensure the performance and functionality of the HOSC systems on equivalent or completely operational platforms. Use software test and integration methodologies that define standards and procedures to ensure complete, consistent meeting of functional requirements. Define, develop and execute all test software and data necessary to support system and subsystem testing, and ensure the correction of any discrepancies identified during verification activities. Develop test and integration reports including impact analysis of faults found.
- i. Provide for database management to include production of specific project and mission databases.

3.1.3 Hardware Engineering

For Hardware Engineering, the contractor shall provide the capabilities to perform the following functions:

- a. Provide hardware engineering for all voice, video, computer, and data communications equipment utilized on this contract.

- b. Conduct system performance studies, recommending appropriate changes to eliminate potential system bottlenecks, resource conflicts, and system overloads. Perform capacity analysis of existing computational, storage and telecommunication systems and supporting resources to ensure that systems performance is compatible with specific system requirements. Provide capacity-planning recommendations based on analysis and changes in requirements and technology.
- c. Isolate problems in systems and effect proper resolution.
- d. Provide risk analysis and management that includes continual identification and assessment of technical, schedule, cost, security and organizational risks involved with the operation of systems.
- e. Perform technology assessments, system upgrade analysis and test, concept prototyping, product evaluations, and human/computer interface evaluations.

3.1.4 Network Engineering

For Network Engineering, the contractor shall provide the capabilities to perform the following functions:

- a. Provide network engineering services for all network equipment utilized on this contract.
- b. Provide network traffic analysis, capacity planning and network performance analysis. Manage and extend as necessary the Simple Network Management Protocol (SNMP) based monitoring and event triggering of alarms of the existing network monitoring system.
- c. Provide routing, wide area network interface and other network support required to transport data (this includes Internet Protocol (IP) telephony and packetized video as well as telemetry and other data) from and to the HOSC. This includes supporting appropriate protocols, firewalls, filters, encryption, Virtual Private Networks (VPNs) and other network-centric techniques to meet the security and interface requirements with external users/facilities.

3.1.5 Independent Verification and Validation (IV&V)

The contractor shall develop a verification program and document it as required by DRD 1016VR-001, Verification Plan For Independent Verification and Validation, the contractor shall provide the capabilities to perform the following functions:

- a. For upgrades to existing mission services and new systems, inspect, test, verify and validate that all system requirements and designs are implemented according to specification.
- b. Perform test and integration of systems to ensure the performance and functionality of the system on an equivalent or completely operational platform.
- c. Develop test plans and procedures that address both hardware and software elements, and internal and external interfaces.
- d. Develop test and integration reports including as-run procedures, test metrics and impact analysis of faults found.
- e. Ensure that Commercial Off-The-Shelf (COTS) software, both applications and operating systems, meet the HOSC-specific requirements without adversely affecting the applications or systems that will be utilized with it.
- f. Ensure that unique databases (e.g., command and/or telemetry) are compatible with the HOSC systems that require their use.

3.2 International Space Station (ISS) Project

The services described under this paragraph are specific to the International Space Station (ISS) project. The contractor shall perform engineering services for ISS payload operations facilities and systems. Included is the MSFC Payload Operations Center (POC). (POC and Payload Operations Integration Center (POIC) are used interchangeably throughout).

The contractor shall provide status, schedule, and metrics data in accordance with DRD 1016MA-003, Progress Reports. The contractor shall maintain a set of integrated ISS project schedules. The contractor shall provide for the collection, formulation, analysis and processing of ISS project requirements, including book manager functions for project documents.

Unless specifically noted in the respective subsequent paragraphs, the contractor shall perform System Engineering (PWS 3.1.1), Software Engineering (PWS 3.1.2), Hardware

Engineering (PWS 3.1.3), Network Engineering (PWS 3.1.4), and IV&V (PWS 3.1.5) for each of the ISS-related HOSC facilities and systems described in the sub-paragraphs of PWS paragraph 3.2.

3.2.1 Payload Control Facilities

The contractor shall perform sustaining engineering for the ISS payload control facilities, consisting of the Payload Operations Center POC and the United States Operations Center (USOC) per MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan, and MSFC-RQMT-1440, Generic Requirements for the Enhanced HOSC System.

3.2.2 Remote Services

The contractor shall provide remote data and voice services in support of ISS payload operations, including support for remote ISS Telescience Support Centers (TSC). This includes providing and sustaining programmatic interfaces for all remote services including telemetry, commanding, voice and user data system access capabilities as defined in SSP 50305, the POIC to Generic User Interface Definition Document (PGUIDD), Volumes 1 & 2. The contractor shall provide these remote services in accordance with MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan, MSFC-RQMT-1440, Generic Requirements for the Enhanced HOSC System, FPD-OI-FD40.7, Remote Servicing Plan, and MSFC-RQMT-3073, Internet Voice Distribution System (IVoDS) Document.

3.2.2.1 Telescience Resource Kit (TReK)

The contractor shall perform only IV&V (PWS 3.1.5) in support of Telescience Resource Kit (TReK), to verify/validate the TReK capabilities as well as the interfaces between TReK and HOSC services.

3.2.2.2 Internet Voice Distribution System (IVoDS)

The contractor shall perform sustaining engineering for the Internet Voice Distribution System (IVoDS) in accordance with the requirements documented in MSFC-RQMT-3073, IVoDS Requirements Document.

3.2.2.3 KSC Support

The services described under this paragraph are specific to the current Kennedy Space Center (KSC) Payload Test and Checkout System (PTCS) project as well as the implementation and future sustaining engineering of the EHS/PDSS Integrated Changeout (EPIC) project.

The KSC PTCS is in the process of migrating from a locally managed set of SGI and SUN servers and workstations running the EHS 8.X series software to a remote set of MSFC managed Linux Servers and KSC locally managed set of Windows based EPC clients.

The contractor shall perform System Engineering (PWS 3.1.1), Software Engineering (PWS 3.1.2), Hardware Engineering (PWS 3.1.3), and Network Engineering (PWS 3.1.4) in support of the KSC PTCS.

The contractor shall only provide configuration, management, and security (patches, security plans) for all HOSC PTCS systems and KSC PTCS Functional Distributed Processors (FDP).

The contractor shall provide POC databases (telemetry and command) compatible with MSFC EHS/PDSS software in support of KSC pre-support integration testing.

The contractor shall perform engineering services to the PTCS operations facility and systems listed in the following three phases;

Phase 1 Development Integration and Checkout

The contractor shall assist in the design, procurement, and installation of the FDP and network interfaces between the MSFC HOSC and KSC PTCS.

The contractor shall provide all updates (software, firmware, configurations) to the FDPs located at the KSC PTCS.

The contractor shall provide the design, procurement, installation of the EHS/PDSS systems located in the MSFC HOSC in support of the KSC PTCS.

Phase 2 Sustaining Engineering for EPIC

The contractor shall be responsible for all updates (software, firmware, configurations) to the FDPs located at the KSC PTCS.

The contractor shall provide Payload Data Services System (PDSS) and Enhanced HOSC System (EHS) application software products installed on the local HOSC systems in support of the PTCS.

Phase 3 EHS Build 8.x Series Software and Maintenance

The contractor shall provide Payload Data Services System (PDSS)/Enhanced HOSC System (EHS) application software products (including baseline software releases and patches with necessary installation instructions) and POC command/telemetry database products to KSC to support ISS payload pre-launch test and checkout from KSC.

The contractor shall provide technical services to include configuration support and product support/trouble shooting for KSC-delivered PDSS/EHS products. Product support is classified as hardware, software, or system (the interaction of both hardware and software, or the interaction of multiple products, e.g. PDSS-EHS).

The contractor shall provide guidance/evaluation for KSC-proposed hardware/software purchases, on an as-needed basis, to ensure that KSC-supplied components will be compatible with MSFC-supplied EPC software.

3.2.3 Payload Data Services System (PDSS)

The services described under this paragraph are specific to the Payload Data Services System (PDSS).

3.2.3.1 PDSS Server Consolidation

The contractor shall perform and complete software and hardware design, development, and testing of PDSS applications associated with the PDSS Server consolidation cost savings initiative activities, which will be in progress when the contract takes effect. Development shall be in accordance with the requirements documented in MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan, MSFC-SPEC-2123, PDSS Development Specification, and MSFC-SPEC-2262, PDSS to EHS Interface Requirements Specification.

3.2.3.2 PDSS Sustaining Engineering

The contractor shall perform sustaining engineering for the PDSS, including the upgrades defined in paragraph 3.2.3.1, in accordance with the requirements documented in MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan, MSFC-SPEC-2123, PDSS Development Specification, and MSFC-SPEC-2262, PDSS to EHS Interface Requirements Specification.

3.2.4 Payload Planning System (PPS)

The services described under this paragraph are specific to the Payload Planning System (PPS).

3.2.4.1 PPS Re-Engineering Initiative

The contractor shall perform and complete software and hardware design, development, and testing of PPS applications associated with the PPS Re-engineering initiative, which will be in progress when the contract takes effect. Development shall be in accordance with the requirements documented in MSFC-SPEC-3229, Payload Planning System (PPS) System Specification.

3.2.4.2 PPS Sustaining Engineering

The contractor shall perform sustaining engineering for the Payload Planning System (PPS), including the upgrades defined in paragraph 3.2.4.1, in accordance with the requirements documented in MSFC-SPEC-3229, Payload Planning System (PPS) System Specification.

3.2.5 Enhanced HOSC System (EHS)

The services described under this paragraph are specific to the Enhanced HOSC System (EHS).

3.2.5.1 EHS Cost Savings Initiative

The contractor shall perform and complete software and hardware design, development, and testing of EHS applications (e.g., EHS PC migration, Linux migration) associated with the EHS cost savings initiatives, which will be in progress when the contract takes effect. Development shall be in accordance with the requirements documented in MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan, and MSFC-RQMT-1440, Generic Requirements for the Enhanced HOSC System.

3.2.5.2 EHS Sustaining Engineering

The contractor shall perform sustaining engineering for the Enhanced HOSC System (EHS), including the upgrades defined in paragraph 3.2.5.1, in accordance with the requirements documented in MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan, and MSFC-RQMT-1440, Generic Requirements for the Enhanced HOSC System.

3.2.6 ISS Downlink Enhancement Architecture (IDEA)

The contractor shall complete the development, implementation, and test for the ISS Downlink Enhancement Architecture (IDEA) project, and perform maintenance, in

accordance with MSFC-PLAN-3340, IDEA Development Plan. This development will be in progress when the contract takes effect.

3.2.7 Microgravity Development Laboratory (MDL) and MSFC Telescience Support Center (TSC) Support

The contractor shall provide support for the Microgravity Development Laboratory and MSFC Telescience Support Center (TSC), in accordance with the requirements documented in MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan.

The contractor shall perform only System Engineering (PWS 3.1.1), Hardware Engineering (PWS 3.1.3), and Network Engineering (PWS 3.1.4) in support of the MDL and TSC.

3.3 Shuttle Project

The services described under this paragraph are specific to the Shuttle project.

The contractor shall provide engineering services for the Shuttle Engineering Support Center (SESC), the Data Reduction Center (DRC) and the Meteorological Interactive Data Display System (MIDDS) Room. The contractor shall provide monthly status reports per DRD 1016MA-003.

Unless specifically noted in the respective subsequent paragraphs, the contractor shall perform System Engineering (PWS 3.1.1), Software Engineering (PWS 3.1.2), Hardware Engineering (PWS 3.1.3), Network Engineering (PWS 3.1.4), and IV&V (PWS 3.1.5) for each of the Shuttle-related HOSC facilities and systems described in the sub-paragraphs of PWS paragraph 3.3.

Specifically, the contractor shall provide engineering support to the Shuttle project as specified in PWS paragraphs 3.3.1 through 3.3.4.

3.3.1 Shuttle Engineering Support Center (SESC)

The contractor shall perform sustaining engineering for the SESC facility per MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan. The contractor shall provide for operational requirements for PC Goal software to support pre-launch, launch and flight operations as defined in MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan, Volume 1, Chapter 2.

The contractor shall perform only System Engineering (PWS 3.1.1), Hardware Engineering (PWS 3.1.3), and Network Engineering (PWS 3.1.4) in support of the SESC.

3.3.2 Data Reduction Center (DRC)

The contractor shall perform sustaining engineering of data reduction services for Shuttle launches and related activities, including data acquisition, data reduction and archival of Space Shuttle launch and test data.

The contractor shall make all appropriate changes to MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan, and other HOSC documentation to integrate the Shuttle DRC into the current HOSC processes.

The contractor shall perform the work described below in support of the 2nd Generation Program Office.

1. Receive data files by electronic transfer or DVD from the Electromagnetic Interference (EMI) Test to be conducted at Orbital Dulles.
2. Process and provide plots of measurements in PDF File format.
3. Plot 120 to 180 selected measurements of the 700-800 available.
4. Received files will be in Matlab Level 4 format.
5. Plot files will be transferred to the ED10 VRC System

3.3.3 Meteorological Interactive Data Display System (MIDDS)

The contractor shall perform sustaining engineering of the MIDDS facility per MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan. The contractor shall ensure system wide compatibility with other MIDDS nodes, Johnson Space Center (JSC) and Cape Canaveral Air Force Station (CCAFS), and the MSFC MIDDS user community.

The contractor shall perform only System Engineering (PWS 3.1.1), Hardware Engineering (PWS 3.1.3), and Network Engineering (PWS 3.1.4) in support of the MIDDS.

3.4 Chandra X-Ray Observatory Project

The services described under this paragraph are specific to the Chandra X-Ray Observatory project.

The contractor shall perform sustaining engineering for the Chandra Engineering Support Center in the HOSC according to MSFC-PLAN-904, HOSC Functional Requirements and Implementation Plan – Program Requirements, Volume 1, Section 6.

The contractor shall perform the work necessary to complete the port of the CXO ONLS software system from Silicon Graphics IRIX to Intel-Base Hardware with the Linux Operating System used in the operations of the Chandra X-ray Observatory (CXO) from the Chandra Operations Control Center (OCC) located at the Chandra X-ray Center (CXC) in Cambridge, MA.

The contractor shall perform System Engineering (PWS 3.1.1), Software Engineering (PWS 3.1.2), Hardware Engineering (PWS 3.1.3), Network Engineering (PWS 3.1.4), and IV&V (PWS 3.1.5), as required, in support of the Chandra Engineering Support Center.

3.5 Project-Independent Engineering Tasks

The contractor shall provide support for project-independent engineering tasks, within the scope of the HOSC contract, as required.

The contractor shall perform System Engineering (PWS 3.1.1), Software Engineering (PWS 3.1.2), Hardware Engineering (PWS 3.1.3), Network Engineering (PWS 3.1.4), and IV&V (PWS 3.1.5), as required, in support of these tasks.

4.0 Operations and Maintenance (O&M)

This paragraph defines all operations and maintenance (O&M) required to support the program requirements, systems and missions. Paragraphs 4.1 through 4.6 describe generic O&M functions to be performed for the HOSC, in support of all projects. Paragraphs 4.7 through 4.9 contain project-specific requirements.

The contractor shall develop the Operations and Maintenance approach to be used and report it in accordance with DRD 1016OP-001 Operations/Maintenance Plan. The systems operated and maintained are divided into two categories, infrastructure and project specific. Infrastructure (e.g., voice and video systems) includes those systems that provide services to multiple projects from a single system. Project specific systems are those systems that provide service to a single project.

The contractor shall provide operations and maintenance including upgrades support to the HOSC, in accordance with FPD-OI-FD43.1, Ground Systems Operations. The contractor shall plan, schedule and configure the facility for mission operations activities including individual mission, simulation, and training sessions. The contractor shall execute testing and simulation for real-time activities to ensure operational support readiness.

The contractor shall provide voice, video, command, and data processing services in support of real-time operations. The HOSC services shall be provided based on project mission specific requirements for the duration of the mission.

The contractor shall continuously review and assess the future direction of operations and take advantage of technical innovations and process improvements that would result in increased quality, reliability or customer satisfaction for the HOSC facilities and systems.

4.1 Procedures Maintenance, Development and Testing

The contractor shall develop, maintain, verify and validate procedures necessary for the operation of the HOSC. Procedures relating to console operations, system operations, disaster recovery, operational workarounds and mission-specific operations shall be included. These procedures shall also include recovery and backup processes.

The contractor shall develop, maintain and test procedures necessary for the verification and validation of all HOSC data systems. These procedures shall include upgrades to existing systems and new systems to be integrated into the facility.

4.2 Problem Management and Resolution

The contractor shall provide for problem management and resolution within the HOSC and the remote user community for systems and facilities. The contractor shall maintain the automated problem management system to track and status problems, resolutions and problem trends by system and customer.

4.3 User Support Services

The contractor shall provide liaison services between HOSC operational personnel and the HOSC customers, in support of real-time flight operations.

The contractor shall provide HOSC users, both local and remote, with technical assistance for installation, configuration and operation of all HOSC systems.

The contractor shall provide help desk services to aid local and remote users in the operation of systems and functions. The contractor shall provide this service based on project unique requirements. The contractor shall maintain a Help Desk to provide HOSC end-user training and support.

4.4 HOSC Mission Services

The contractor shall perform operations and maintenance on all HOSC systems. The contractor shall maintain operational services in accordance with project specific

requirements. The contractor shall provide operations of HOSC systems, with the capability to support operations on a 24-hour per day by 7 days per week basis, in response to project requirements. The contractor shall report the availability of HOSC mission services in accordance with DRD 1016MA-008, Performance Requirements Summary.

4.4.1 Voice Systems

The contractor shall provide voice services to all HOSC programs and projects. The contractor shall operate and maintain the central voice switch or switches, cabling, voice instruments, and other supporting infrastructure, for internal HOSC users and external remote users. The contractor shall provide inter-center access control for operationally critical, private, or otherwise sensitive voice circuits during operations.

4.4.2 Video Systems

The contractor shall provide video services to all HOSC programs and projects. The contractor shall operate and maintain the central matrix switch or switches, cabling, end video instruments, and other supporting infrastructure, for internal HOSC users.

4.4.3 Computer Systems

The contractor shall provide services for the utilization of databases, applications software, user computations, command files and other user products necessary for real-time support.

The contractor shall process mission-specific data and maintain access to controlled databases.

The contractor shall provide system monitoring, computer operations and identification of problems associated with HOSC hardware, systems configuration, operating systems, COTS and unique applications software.

The contractor shall provide system operational support services for HOSC resources and equipment to include computers, consoles, workstations, networks, databases and other special equipment for local and remote operations.

The contractor shall configure, operate, test and validate local network interfaces to include data network monitoring.

The contractor shall provide real-time maintenance and change-out to maintain critical systems.

The contractor shall identify and isolate problems associated with systems and networks, and perform/support problem resolution.

4.4.4 Data Storage

The contractor shall provide data storage services based on project requirements. This includes the data storage hardware and software as well as user access capabilities. Data storage services include capabilities for receiving, storing, processing, distributing, tracking, converting, recalling and protecting engineering data.

4.4.5 System Administration and Management

Systems Administration and Management shall encompass the full range of system activities needed to assure continued operations and development.

The contractor shall perform database administration for HOSC computer and network resources, install databases for mission support, configure accounts per mission-specific requirements, and establish HOSC computer system and database backup processes for system recovery purposes.

The contractor shall manage data storage devices, such as disks or tapes, and associated storage libraries.

The contractor shall create backup files for storage and maintenance according to approved policies and procedures.

The contractor shall install, checkout and test all hardware required to fulfill the O&M functions, including development systems. The contractor shall configure hardware for integrated development testing, delivery, and accessibility control of operational configurations.

The contractor shall install upgrades and patches to system software and COTS products.

The contractor shall provide development, test and operations support to investigate and resolve system problems.

The contractor shall perform system software installations and upgrades. The contractor shall track the release of HOSC software in accordance with NPG 2210.1, External Release of NASA Software and report it as described in DRD 1016MA-007.

The contractor shall provide administration functions to support the HOSC systems and networks required for HOSC operational and development activities, and provide administration functions to support the HOSC administrative (non-operations) networks required to support HOSC activities.

The contractor shall configure system and network audit capabilities to collect and log security audit and network performance data, review network and system security audit logs daily, and provide support for Operating System and COTS installation, configuration and maintenance including backups and failure recoveries of all operational and development systems in accordance with MPD 2800.1, Management of IT Systems at MSFC.

The contractor shall perform vulnerability scans on all existing and new systems connected to the HOSC networks using NASA provided software as determined by the MSFC IT Security Team. The contractor shall keep metrics on the security alerts/patches and prepare and deliver a monthly IT Security Status Report to NASA in accordance with DRD 1016MA-005.

The contractor shall monitor in real-time all systems and functions commensurate to the system's priority in order to assure continued operations. The contractor shall track and report system problems and status to assure closure of open issues. The contractor shall perform preventive maintenance on all hardware and software systems required to support HOSC operations and development. The contractor shall track system maintenance activities status to assure closure of open issues and report them in accordance with DRD 1016MA-006, Systems Status Monthly Report.

4.5 Ground Systems Requirements Integration

The contractor shall perform operations requirements integration and mission support planning for coordination of HOSC operational support activities, and coordinate operational support planning across all system elements to ensure implementation and maintenance uniformity in accordance with HOSC-PLAN-623, HOSC Project Plan.

The contractor shall provide for the collection, formulation, integration, analysis and processing of system, mission and communication requirements from customers (within the HOSC as well as for remote users). The contractor shall integrate requirements and systems to enhance efficiencies and minimize costs. The contractor shall conduct operations integration and planning to ensure coordination of all operations disciplines and integrated planning across all system elements, including Government-Furnished Property (GFP). The contractor shall support technical interchange meetings with users. The contractor shall forecast and assess future mission requirements. Reporting shall be in accordance with DRD 1016MA-003, Progress Report.

The contractor shall provide mission coordination services to ensure that all requirements and support commitments are interpreted and documented with regard to facility and system configurations.

The contractor shall collect and document mission-specific requirements for implementation and integration into HOSC systems and processes.

The contractor shall coordinate access to HOSC systems in accordance with HOSC-PROC-180, HOSC Standard Operating Procedure.

The contractor shall ensure inter-center operational support requirements and implementation program commitments are fulfilled.

The contractor shall evaluate mission support requirements for HOSC communications and data systems against current capabilities, verify operations procedures and management plans, and ensure that all necessary equipment is in operating condition prior to scheduled activity support.

4.6 Facilities

The contractor shall implement and maintain a uniform system for managing the use of assigned building 4663 facilities in accordance with HOSC-HDBK-003, HOSC Facilities Document, HOSC-PLAN-009, HOSC Contingency Plan, MSFC-PLAN-2934, HOSC Emergency and Disaster Recovery Plan, and MSFC-PROC-1933, Huntsville Operations Support Center (HOSC) Access Procedures. The contractor shall provide facility planning, assessments, analysis and installation planning and support. The contractor shall plan and coordinate required facility modifications with cognizant HOSC facility personnel. Reporting shall be in accordance with DRD 1016CD-002, On-Site Employee Location List, and DRD 1016MA-003, Progress Report.

The contractor shall provide HOSC facility coordination, workload control and systems scheduling services. The contractor shall integrate the product load, facility and equipment configurations, and systems to support mission activities.

The contractor shall maintain HOSC floor plans for all assigned facilities to document the location of furniture, equipment, and electrical services and plan for future facility requirements or expected changes in personnel and equipment locations that includes power, lighting, square footage, layout, heating, ventilation, and air conditioning (HVAC), and fire suppression and detection.

The contractor shall assess and implement HOSC Configuration Request (HCR) changes.

The contractor shall coordinate and status operational room configurations within the HOSC and provide computer-aided design drawings for any reconfiguration change and new facility development.

The contractor shall coordinate and schedule facility support activities including the configuration and reconfiguration of each facility without impacting on-going operations.

The contractor shall provide inter-center coordination and scheduling for external HOSC interfaces, and interfaces to remote sites.

4.7 International Space Station (ISS) Project

The services described under this paragraph are specific to the International Space Station (ISS) project. Paragraph 4.7.1 contains ISS specific requirements relative to the generic O&M functions described in PWS paragraphs 4.1 through 4.6. Paragraphs 4.7.2 through 4.7.4 define additional O&M tasks that must be performed in support of the ISS project.

4.7.1 Specific Mission Support

The International Space Station Payload Operations Integration Function (POIF) project uses all of the HOSC basic services to operate the Payload Operations Center (POC). The contractor shall maintain these services for the duration of the ISS POIF project. The contractor shall provide complete support for each ISS mission, experiment and ISS increment in accordance with a flight/mission specific HOSC Mission Configuration Supplement (HMCS).

Per PWS paragraph 4.3, User Support Services, the contractor shall provide training and Help Desk services related to the use and operation of equipment and systems to users, both local and remote, and operators. The contractor shall provide classroom and hands-on training, demonstrations, documentation, training materials and training records. The contractor shall deliver training in the form of training seminars and local/remote instructor led classes. Training records shall be developed and maintained.

Per PWS paragraph 4.4, HOSC Mission Services, the contractor shall provide voice, video and data processing services in support of ISS real-time operations on a continuous 24-hour basis. Day shift technical support to address critical problems encountered after normal working hours shall be provided on a call-in basis with a 2-hour response time. In addition to the 24-hour real-time support, the contractor shall provide 40 hours of weekly support to include ISS test activities, mission preparation, training, development test and simulation activities during the normal day shift.

Per PWS paragraph 4.5, Ground Systems Requirements Integration, the contractor shall maintain the Program Requirements Document (PRD)/Database in accordance with JSC-27379, Support Requirements System Management Plan to reflect all inter-center requirements for the POC.

4.7.2 POC Database Production

The contractor shall produce POC command and telemetry databases in support of tests and flight. The contractor shall build, validate and deliver an average of 3 command and 3 telemetry databases per ISS Flight (engineering, preflight, and flight). The contractor shall process up to 3 Payload Data Library (PDL) exports for each of the 3 telemetry databases per flight as required. The contractor shall utilize procedures and scripts to ensure complete, consistent database population, and provide "as populated" database documentation.

4.7.3 Certification of Flight Readiness (CoFR)

The contractor shall report mission and systems validation, verification and Certification of Flight Readiness (CoFR) in accordance with paragraph 4.3 of FPD-OI-FD40.4, Flight Certification for Ground Systems. The contractor shall certify systems and personnel where required.

4.7.4 KSC Payload Test and Checkout System (PTCS) Operations & Maintenance Support

The services described under this paragraph are specific to KSC PTCS support. Paragraph 4.7.4.1 contains KSC PTCS specific requirements relative to the generic O&M functions described in PWS paragraphs 4.1 through 4.6.

4.7.4.1 Specific Mission Support

The contractor shall perform Operations and Maintenance Support to the PTCS operations facility and systems listed in the following three phases;

Phase 1 Development Integration and Checkout

The contractor shall update, configure, and maintain the software and associated configurations on the EHS/PDSS systems located in the MSFC HOSC in support of the KSC PTCS.

The contractor shall assist and coordinate Memorandum of Understanding of work needed to support KSC PTCS activities.

Phase 2 Sustaining EPIC Support

The contractor shall provide the KSC PTCS with the suite of all HOSC basic services to support PTCS Payload Integration testing. The contractor shall maintain these services in accordance with an agreed to Memorandum of Understanding between KSC and MSFC. Date and Reference numbers TBD. . The contractor shall provide complete support for each PTCS Payload Integration support activity in accordance with a flight/mission specific HOSC Mission Configuration Supplement (HMCS).

Per PWS paragraph 4.4, HOSC Mission Services, the contractor shall provide voice, video, and data processing services in support of KSC PTCS payload integration testing on as-scheduled basis.

The contractor shall provide technical support to address critical problems encountered during test execution. The contractor shall provide support on an as-scheduled basis for pre-support checkout and certification.

The contractor shall provide support to configure and maintain remotely the Functional Distributed Processor (FDP) and network interfaces between the MSFC HOSC and KSC PTCS.

The contractor shall update, configure, and maintain the software and associated configurations on the EHS/PDSS systems located in the MSFC HOSC in support of the KSC PTCS.

The contractor shall support database changes and reconfigurations during payload testing at KSC PTCS.

Phase 3 EHS Build 8.x Series Software and Maintenance

The contractor shall provide necessary technical assistance to the Kennedy Space Center for delivered PDSS/EHS application software and POC command/telemetry database release installations, in addition to providing on-call day-shift help desk/engineering support for problems experienced by the KSC Payload Test and Checkout System (PTCS).

Services shall be delivered on-site at KSC, or remotely from MSFC, as appropriate to the problem or technical issue. Technical services shall be available on an 8 hr-per-day by 5days-per-week basis.

4.8 Shuttle Project

The services described under this paragraph are specific to the Shuttle project. Paragraph 4.8.1 contains Shuttle specific requirements relative to the generic O&M functions described in PWS paragraphs 4.1 through 4.6. Paragraph 4.8.2 defines additional O&M tasks that the must be performed in support of the Shuttle project.

4.8.1 Specific Mission Support

Per PWS paragraph 4.4, HOSC Mission Services, the contractor shall provide voice, video and data processing services in support of Shuttle test, simulation, pre-launch, launch and flight operations. The contractor shall provide on-site support during Level A Shuttle activities (Systems, Network, and MIDDS), and for special activities. The contractor shall coordinate system activities with other MIDDS nodes, Johnson Space Center (JSC) and Cape Canaveral Air Force Station (CCAFS), and the MSFC MIDDS user community.

The contractor shall provide on-call support for non-Level A Shuttle activities.

Per PWS paragraph 4.4, HOSC Mission Services, the contractor shall provide telemetry controller/operations coordination in accordance with MSFC-PROC-1613, Joint Operations Procedures for the Kennedy Marshall Transmission System. The contractor shall provide for inter-center communication coordination for test, simulation, pre-launch, launch and flight operations.

Per PWS paragraph 4.4.4, Data Storage, the contractor shall create a best-source merge of telemetry data from real-time, playback and dump sources. The contractor shall archive raw and processed telemetry data and create data reduction products as required. The contractor shall provide support including loading of data, verification of historical data, checkout, maintenance and processing of data.

4.8.2 Certification of Flight Readiness (CoFR)

The contractor shall report mission and systems validation, verification and Certification of Flight Readiness (CoFR) in accordance with paragraph 4.3 of FPD-0I-FD40.4, Flight Certification for Ground Systems. The contractor shall certify systems and personnel where required.

4.9 Chandra X-Ray Observatory

The services described under this paragraph are specific to the Chandra project. Paragraph 4.9.1 contains Chandra specific requirements relative to the generic O&M

functions described in PWS paragraphs 4.1 through 4.6. There are no additional unique O&M tasks to be performed in support of the Chandra project.

4.9.1 Specific Mission Support

Per PWS paragraph 4.4.1, Voice Systems, and PWS paragraph 4.4.5, System Administration and Management, the contractor shall provide voice and network services in support of ongoing Chandra operations.