DATA PROCUREMENT DOC. NO. **1145** ISSUE **Basic**

NNM07AB03C
CONTRACT/RFP

EXHIBIT NUMBER

J-2
ATTACHMENT NUMBER

Ares I Upper Stage Production
PROJECT/SYSTEM

DATA PROCUREMENT DOCUMENT

Boeing
CONTRACTOR

August 28, 2007
DATE

National Aeronautics and
Space Administration

MSFC - Form 3461 (Rev September 1989)

DRD Development and Responsibility Overview

The DRDs for this contract will be tailored to accommodate the transfer of the NASA design to the Contractor-provided production and sustaining engineering.

Initially, the Contractor shall support the NDT, in accordance with the SOW, by providing data developed for SCI described in the DDT&E sections of the SOW (CLIN 1). The NDT is responsible for systems integration and will develop system level data requirements with the Contractor's support. The SOW states the Contractor shall support in these cases. The Contractors support by supplying SCI design and operations data for integration of the part into the system design and analysis.

After DCR, the Contractor shall assume responsibility of the sustaining engineering of the system design and as such, shall assume responsibility of system data requirements previously supported from a component perspective. Planning for transition of the sustaining engineering will be described by the Contractor per the SOW section 4.7.

National Aeronautics and Space Administration

DOCUMENT CHANGE LOG

DATA PROCUREMENT DOC.
NO. 1145 ISSUE RFP

INCORPORATED REVISIONS
OUTSTANDING REVISIONS

AS OF: 02-22-07

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 **1145 RFP**	
NOTE: The current revision is denoted by a vertical line in the outer margin adjacent to the affected text.	AS OF: 02-22-07	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 DISCARD SUPERSEDED PAGES.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, an Introduction, a Statement of General Requirements, DPD maintenance procedures, a DRL/Matrix, and the DRDs.

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 DRDs.

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 (DRDs)

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, DRDs 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
MP	Materials and Processes
OP	Mission Operations
QE	Quality Engineering
RM	Reliability and Maintainability
SA	Safety
VR	Verification

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 DRDs 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 DRDs.

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 Statement of Work, 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 includes 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 export control official, and/or unless an export license/license exemption is obtained/available from the United States Department of State. Violations of these regulations are punishable by fine, imprisonment, or both.

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.

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 entry into ICE, 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://webpubnis.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 ECPs 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 DRDs 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.

Data Requirements Matrix

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
1145CD-001	Contract Information Technology Security Program Plan	2	IS10													Revise after any significant changes. Review and update every three years.
1145CD-002	Information Technology (IT) Security Requirements Compliance Documents	2	IS10													For existing IT systems, 60 days after contract award. For new IT systems, initial submission is required at the conclusion of the Implementation phase and before the Operational phase of the System Development Life Cycle (SDLC). The compliance documents shall be reviewed and updated on a yearly basis and after any significant changes to the IT System including personnel changes required to keep point of contact information current.
1145CD-003	Technology Reports	3	ED03													*This DRD consists of multiple deliverable documents. See below for submission requirements for each document.*
	Technology Reporting Plan	3	ED03													Upon Contracting Officer's request
	Disclosure of Invention and New Technology (NASA Form 1679)	3	ED03													Within 2 months of identification of reportable item (For each reportable item)
	Interim NASA-MSFC Technology Report (NASA Form c3041 or c3042)	3	ED03													12 months from the date of the contract; every 12 months thereafter
	Final NASA-MSFC Technology Report (NASA Form c3041 or c3042)	3	ED03													Three months after completion of contracted work

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
1145C M-001	Acceptance Data Package	1	ED03										P*			*Two weeks prior Final with delivery of each Configuration Item (CI)
1145C M-002	Deviation/Waiver Approval Request	1	ED03													As required
1145CM-003	Engineering Change Proposals (ECP) and Associated Documentation	1	ED03													As required
1145C M-004	Configuration Management Plan	2	ED03				X									Revise as requried
1145C M-005	Functional Configuration/ Physical Configuration Audit Documentation	2/3	ED03													See Attachment 2; Per configuration audit
1145C M-006	Data Accession List	3	ED03			X										Monthly
1145CM-007	Engineering Drawings and Associated Lists	2	ED03							X						As part of each major review data package, as part of an Acceptance Data Package, and as requested. In addition, 3D CAD Models shall be submitted between milestones as requested by the procuring activity.
1145CM-008	Specification and Drawing Trees	2	ED03							X	F	F				Specification and Drawing trees updated for DCR and the Physical Configuration Audits (PCA) or as requested
1145DE-001	Electrical, Electronic, and Electromechanical Nonstandard Parts Approval Request	1	EI42								X*					Part 1: When need first identified. Part 2: As required to support Part 1. *Part 3: As required; as requested
1145DE-002	Electrical, Electronic, and Electromechanical (EEE) Parts Control Plan	2	EI42							X	X					
1145DE-003	Programmable Devices Development Plan	2	EI31							F						Three months after ATP. Update as required
1145DE-004	As-Designed EEE Parts Lists	2	EI42							X*	X**					*30 days prior **Part 1: 30 days prior Part2: Updates, as required

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
1145DE-005	Fracture Control Plan	2	FM20					X		X	X					Three months after ATP. Updated as required
1145DE-006	Fracture Control Reports Inputs	2	EM20							X	X	X			X	
1145DE-007	Structural Dynamics Analyses, Loads and Models Documentation	2	EI13/EV31							X	X	X			X	Updates as necessary according to program design milestones or test milestones
1145DE-008	Thermal Design Data Book	2	EV34/ER43 /EI13							X	U*					*Update as required for CDR and any major review design review as part of the submitted data packages. Additional updates shall be provided as necessary to capture significant thermal design or analytical changes. The baseline revision is expected no later than CDR+3 months with subsequent resubmissions following major element verification testing.
1145DE-009	Structural Assessment Plan	2	ER42					X		X	X	X			X	Update as required
1145DE-010	Development Test Reports	2	JP30													20 days after completion of each development test activity. Once per development test activity.
1145DE-011	Development Test Procedures	2	JP30							X						Baseline 10 days prior to start of the related development activity.
1145DE-012	Thermal Analysis Report	2	JP30								X*	X				*Thermal models and geometry
1145DE-013	Structural Strength and Fatigue Analysis Report	2	ER21							X		X				
1145DE-014	Design Definition Document	2	JP30													As directed to support the Upper Stage Design Analysis Cycles
1145DE-015	Development Unit Test Planning	3	ER33							D	F					

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
1145DF-016	Programmable Devices Design Documentation	3	EI31							X*						*Three weeks prior Three weeks prior to each major review; as part of an Acceptance Data Package; as requested
1145DF-017	Engine Thermal Data and Analysis	3	ER32							X*	X					*30 days prior
1145LS-001	Government Property Management Plan	2	AS41					P*								*Three months after ATP Final one year after ATP, revise as required
1145LS-002	Integrated Supportability Plan	2	EV12					X								Update semi-annually and to be provided for formal reviews; deliveries at formal reviews each take place of one semi-annual delivery.
1145LS-003	Warehouse/Storage Requirements Plan	2	AS40							D						Semiannually for first year (annually thereafter); update as new requirements are determined.
1145LS-004	Construction of Facilities (CoF) Quarterly Report	2	AS41					X								Annually
1145LS-005	Annual and Monthly Financial Reporting of NASA Property in the Custody of Contractors	3	AS41/RS22													Due Date for the annual submission of the NF 1018 from NFSS is October 15 per NFS 1852.245-73. Due Dates for the monthly submittals from CHATS reporting contracts are the 21st day after the close of the month.
1145MA-001	Project Management Plan	1	CS40				X									Update as required
1145MA-002	Cost Analysis Data Requirement (CADRe)	1	CS50							X*	X**					*90 days prior to, the first submission shall contain a higher level of program and technical information than contained in the full CADRe. **90 prior to Key Decisions Points **90 prior to 180 days after launch and End of Mission
1145MA-003	Program Operating Plan (POP)	2	JP30													Per Program/Project direction As required

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
1145MA-004	Integrated Master Schedule	2	CS40					X								Three months after ATP. Initial – first calendar month following the end of the first full month after Authority to Proceed. Monthly
1145MA-005	Work Breakdown Structure (WBS) and WBS Dictionary	2	CS40			X										Update as required. Revised pages shall be submitted 10 calendar days after contract WBS changes (following Government approval)
1145MA-006	Continuous Risk Management	2	QD40													*This DRD consist of multiple deliverable documents. See below for submission requirements for each document.*
	Continuous Risk Management Plan	2	QD40				X									Update as required
	Continuous Risk List, Analysis and Tracking Report	2	QD40				X									Monthly
	Lesson Learned Search Reports and Lessons Learned Search Submittals	2	QD40							X						Due at each subsequent major review and as appropriate throughout the project lifecycle.
1145MA-007	Major Review Documentation	2/3	ED03							X	X	X	X	X	X	Per technical review. **See DRD for specific submittal requirements.**
1145MA-008	Financial Management Report (533M and 533Q)	3	CS40													*This DRD consists of multiple deliverable documents. See below for submission requirements for each document.*
	Financial Management Report (533Q)	3	CS40													An initial report in the 533Q format is required no later than 30 working days after Authority to Proceed. 533Q: Quarterly; no later than 15th day of the month proceding the quarter being reported in columns 8a, 8b, and 8c.

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
	Financial Management Report (533M)	3	CS40													Initial 533M reporting shall begin no later than 30 days after the incurrence of cost. 533M: Monthly; no later than 10 working days following the close of the contractor's accounting month.
1145MA-009	Badged Employee and Remote IT User Listing	3	AS50													No later than 10 working days after Authority to Proceed. 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.
1145MA-010	Contractor Employee Clearance Document	3	AS50													Immediately when the access isno longer needed. As required
1145MA-011	Cost Performance Report	3	CS40					X								Monthly; by the 12th working day following the close of the prior month accounting period. Format 5: Initial Cost Performance Report (CPR) shall contain rankings of cost and schedukle drivers. Update list of the cost and schedule driver rankings in Format 5 every six months, based on performance to date.
1145MA-012	Position Risk Designation for Non-NASA Employee Form	3	AS50													No later than 10 working days after Authority to Proceed (ATP). Update as personnel or position changes occur.
1145MA-013	Still Photographs, Video, and Motion Pictures	3	IS30													Document events as required
1145MA-014	Subcontractor and Geographic Data Collection	3	JP30													Six months after contract award, Update January and July of each Contract Year.

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
1145MP-001	Contamination Control Plan (CCP)	1	EM03							X*						*One month prior One month prior to milestones reviews, update as required
1145MP-002	Materials and Processes Identification and Usage List (MIUL)	1	EM30							X			X*		X**	*As-designed at Hardware Acceptance Review **As-built MIUL updates prior
1145MP-003	Manufacturing and Assembly Plan	1	EM03	D						X*	F					*One month prior Two weeks prior to milestone reviews, update as required
1145MP-004	Materials and Processes Selectin, Implemenation, and Control Plan	1	EM03							X*						*One month prior One month prior to CDR, update as required
1145MP-005	Materials Usage Agreements (MUAs)	1	EM03							X*						*One month prior At PDR and as the need for new MUAs is identified during the detailed design process. MUAs shall be revised and resubmitted whenever design modifications affect the part numbers identified on the MUA or the MUA rationale
1145MP-006	Nondestructive Test (NDT) Plan	1	EM03							X*						*One month prior **Two weeks prior to milestone reviews; revise as required
1145OP-001	Post Flight Reports and Data	3	JP30													60 days after mission completion One time
1145OP-002	Operations and Maintenance Manuals	3	JP30								P					Final with hardware delivery
1145QP-001	Quality Plan	1	QD10													Overview with proposal; baseline 60 days after ATP. Update as design matures and risks and their quality related mitigating factors are better defined.
1145QP-002	Software Assurance Plan	1	QD40				X									Update as required
1145QP-003	Certification Approval Request	1	JP30													Draft 60 days pror to each test Update as required
1145QP-004	Certificate of Qualification (COQ)	1	QD40							X						Update as required

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
1145QF-005	Software Quality Assurance (SQA) Audit Report	3	QD40													10 working days following first software quality assurance audit. One report for each SQA audit
1145QF-006	Equipment Log Book	3	QD40							X						Update as required
1145RM-001	Reliability and Maintainability (R&M) Program Plan	1	QD40				X			X*						*Baseline after
1145RM-002	Failure Modes and Effects Analysis (FMEA) and Critical Items Lists	1/2	QD40							X*	X*	X*				*30 days prior DCR change packages when the design change impcts the FMEA and/or the CIL.
	Problem Reporting and Corrective Action (PRACA) System and Trending	1/2/3	QD40				X									Lesser of 48-hours from isolation of reportable problem to line replaceable unit or 10 days from occurrence of each reportable problem. For each occurrence, initial notification; then, interim/full resolution submittals as they are developed. Status reports/updates are required as they occur until satisfactory closeout or explanation is provided. For all reportable hardware/software problems, interim closure submittal is required prior to the mission. The interim closure submittal shall include the mission rationale and a plan of action schedule for developing full closure rationale.
1145RM-004	Limited Life Items List	2	QD40							X*	X**					*One month prior **One month prior; update as required

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
1145RM-005	MSFC ALERT System Documentation	3	QD40													Upon first event of a receipt or identification of ALERT issue. MSFC disseminated ALERTS: Initial response or justification of a single 30-day response extension due to MSFC within 21 working days except during the launch imminent mode, when investigation and disposition of the potential problem shall be performed expeditiously to preclude constraint of flight. Contractor's initiated ALERTS: Due to MSFC within ten working days of identification of reportable issue, for review and approval.
1145SA-001	System Safety Hazard Analysis	1	QD01							X						Initial contractor submission will support the first post-transition safety and flight readiness reviews. Hazard analyses shall be developed in parallel and in support of design, development, and operational phases of the program. The hazard analyses shall mature as the program matures and shall be submitted for review/approval to support major milestones (Cepteual Design, PDR, CDR and DCR or equivalent program milestones) and program safety reviews. Shall also comply with the requirements found in the applicable documents.

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
1145SA-002	Fault Tree Analysis	1	QD10							X	X	X				The analysis shall be submitted at each major milestone or equivalent program milestones and the program safety review milestone.
1145SA-003	System Safety Plan	1	QD01				X									Update as required. The system shall be updated to be kept current with program status
1145SA-004	Safety, Health, and Environmental (SHE) Plan	2	AS10/QD50	P												Ten days after Authority to Proceed; update as required
1145SA-005	Mishap and Safety Statistics Reports	3	QD50													*This DRD consists of multiple deliverable documents. See below for submission requirements for each document.*
	Type A or B mishaps only	3	QD50													Immediate telephone notification (256-544-0046) for each occurrence of a mishap.
	Type A, B and C mishaps **(applicable to onsite contractors only)**	3	QD50													Flash Report within 4 hours of knowledge on MSFC Form 4370, submitted either electronically at ([illegible]) or by telephone [Call 256-544-4357 (4-HELP); ask operator to fill out MSFC Form 4370 or Flash Report].
	All Mishaps (Type A, B, C, Incidents and Close Calls) - Mishap Report NASA Form 1627	3	QD50													Submit NASA Form 1627 within 6 calendar days of Mishap for each occurrence of a mishap.
	All Mishaps - Follow-up Corrective Action Plan/Status	3	QD50													Monthly Follow-up Corrective Action Plan/Status as required until closed. Corrective action status reports are due every 30 days until the final report is submitted.

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
	Type A, B, and Close Calls with high Type A or B potential - Mishap Board Report	3	QD50													Mishap Board Report after completion of investigation. Mishap Board Reports required for each occurrence of a Type A or B mishap, or as directed by Center management.
	Safety Statistics (e.g., contract number, subcontractors, SIC/NAIC codes, number of employees, number of supervisors, etc.)	3	QD50													Submitted on MSFC Form 4371 by the 10th of each month following contract award.
1145SE-001	Systems Engineering Management Plan	1	EV61					I								Update as required or at Major Review milestones
1145SE-002	Specifications	1	EV62/JP30/ QD02													Draft form one month prior to applicable component Preliminary Design Review. Select component specifications submitted in final form as part of CDR; update as required to accommodate changes.
1145SE-003	Interface Control Documents	1	EV62							X*	X**					*One month prior **Baseline after, update as required
1145SE-004	Launch Commit Criteria	1	JP30								D					Update at Major Design Reviews and as required
1145SE-005	Electromagnetic Effects System Control Plan	2	EI24							X	X	X				Baseline after CDR
1145SE-006	Sustaining Engineering Plan Reports	2/3	JP30							X		B				Update as required
1145SE-007	System Connectivity Diagrams and End-to-End Functional Schematics	3	EV12							D						System Connectivity Diagrams every 60 days after PDR until CDR. End-to-End Functional Schematics at CDR and updates thereafter in accordance with 15.5.

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
1145SE-008	Mass Properties Report	3	EV12											X		Mass Technical Performance Measurements (TPMs) shall be submitted monthly after SRR, full mass properties reports shal be submitted quarterly and with any major review package.
1145SE-009	Requirement Flowdown Matrix	3	EV62							X*	X**					*One month prior **Baseline 120 days after
1145SE-010	Electromagnetic Effects Design Analysis Report	2	EI24								X	X			X	
1145SW-001	Software Requirements Specification	1	EV22							X*	F					*One month prior One document for each software configuration end item; update as required
1145SW-002	Software Configuration Management Plan	2	EV22					P								One time; update as required
1145SW-003	Software Maintenance Plan	2	EV22							P						Update as required
1145SW-004	Software Design Description	2	EV22							X	X*					*Detailed version three weeks prior
1145SW-005	Software Test Plan	2	EV22							X	X*					Update test plan threeweeks prior Final three weeks prior to Software Test Readiness Review.
1145SW-006	Software Test Procedures	2	EV22							X						Final three weeks prior to Test Readiness Review. One issue per software configuration end item, update as required
1145SW-007	Software Test Report	3	EV22													Three weeks after completion of software qualification testing. Upon completion of software regression testing for each CSCI.
1145VR-001	Master Verification and Validation Plan	1	EV62							X	U					Baseline after CDR
1145VR-002	Verification/Validation Requirements	1	EV62													As part of the Requirements Review for the Contractor End Item, Sub-Assembly or Source Control Item. Baseline after specified Requirements Review

DRD Number	Title	Data Type	OPR	Proposal	Contract Award +60	ATP + 30	ATP + 60	ATP + 90	ATP + 120	PDR	CDR	DCR	AR	SRR	FRR	Other
1145VR-003	Verification/Validation Reports	2	EV62													20 days after completion of each verification/validation activity. Once per verification/validation activity.
1145VR-004	Verification/Validation Success Criteria	2	EV62								X					Update as required for DCR. Baseline 90 days before the verification/validation activity begins to support writing approval of the procedures.
1145VR-005	Verification/Validation Procedures	2	EV62													90 days prior to start of the related verification/validation activity. Baseline 30 days prior to the start of the related verification/validation activity.
1145VR-006	Verificaiton/Validation Compliance	3	EV62													As the first verification/validation report is approved. Update and maintain throughout project. Supply status as needed.
1145VR-007	Test Plans	3	JP30													Preliminary plan as agreed upon between NASA Project and contractor. Final 30 days before start of each test series.
1145VR-008	Test Procedures	3	ET01													90 days before start of each test series. Final 45 days before start of each test series.

Legend: B = Baseline. D = Draft. F = Final. P = Preliminary. U = Update. X = Submittal.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: Draft 2. **DRDNO.**:**1145CD-001**
3. **DATA TYPE**: 2 4. **DATE REVISED**:
5. **PAGE**: 1/1

6. **TITLE**: Contract 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 demonstrate and detail how they plan to implement an effective IT security program.

8. **OPR**: IS10 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter. One copy shall go to the Organization Computer Security Official.

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**: The Federal Information Security Management Act (FISMA) of 2002 applies to both information and information systems used by NASA, its contractors, and other organizations and sources, it has somewhat broader applicability than that of prior security law. That is, the NASA IT security program and its requirements apply to all organizations (sources) which possess or use Federal or NASA information - or which operate, use, or have access to Federal or NASA information systems - on behalf of NASA.

14. **INTERRELATIONSHIP**: SOW paragraph 3.3

15. DATA PREPARATION INFORMATION:

15.1 **SCOPE**: The extent of the Contract 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, 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)*
ITS-SOP-00018	*Contract IT Security Program Plan Procedures*

15.3 **CONTENTS**: The Contract IT Security Program Plan shall address the areas of the contractor's IT security program identified in ITS-SOP-00018.

15.4 **FORMAT**: Contractor format is acceptable. The content as identified in ITS-SOP-00018 shall be adequately covered and readily identifiable.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.1145CD-002**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Information Technology (IT) Security Requirements Compliance Document(s)

7. **DESCRIPTION/USE**: To provide an overview of the Contractor's compliance with the IT security requirements in NFS 1852-204-76 and any additions/augmentations described in NPR 2810.1. This document will be used to verify the contractor's compliance including approval of their Organization Senior Management responsible for IT. An IT Security Requirements Compliance Document is required for each IT system identified for information stored, generated, or exchanged by/with NASA or on behalf of NASA by the contractor or subcontractor. This document will be used for the preparation of NASA IT security assessment for identifying the IT systems and appropriate Contractor IT security points of contact.

8. **OPR**: IS10 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**: The NFS 1852.204-76 identifies security requirements for IT Security and Physical and Logical Access for unclassified information technology resources. It specifically identifies IT security requirements that include the preparation of certain IT security documents that are included in the Security Accreditation package required for a National Institute of Standards and Technology (NIST) Certification and Accreditation (C&A) process (reference NIST 800-37). However, NFS 1852.204-76 does not require the Contractor to follow a formal NIST C&A process unless there are any additions/augmentations described in the NASA C&A processes established in NPR 2810.1.

    The NFS 1852.204-76 requires the Contractor to submit to the Contracting Officer an IT Security Plan, Risk Assessment and FIPS 199 Assessment that shall be incorporated into the contract as compliance documents. Due to the critical sensitivity of the content of these documents, this IT Security Requirements Compliance Document will be accepted as evidence that these requirements have been completed. The IT System Security Plan and Risk Assessment documents will be prepared and maintained by the contractor and made available to MSFC IT Security Office upon request as part of any audit or assessment. Any exchange of such sensitive information will utilize appropriate measures to ensure the security of the information they contain. Due to the nature of some contracts, these required documents will be submitted and incorporated into the MSFC C&A processes per NPR 2810.1 and are not submitted directly to the Contracting Officer.

14. **INTERRELATIONSHIP**: SOW paragraph 3.3

DRD Continuation Sheet

TITLE: Information Technology (IT) Security Requirements Compliance Document(s) **DRD NO.: 1145CD-002**

DATA TYPE: 2 **PAGE**: 2/2

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The IT Security Requirements Compliance document will include non-sensitive information about the IT system utilized for performance of the contract, provide reference to policies and procedures required for compliance to IT security requirements, provides dates of compliance and a statement of compliance to be signed by Organization Senior Management responsible for IT.

15.2 **APPLICABLE DOCUMENTS**:

FIPS 200	*Recommended Security Controls for Federal Information Systems*
FIPS 199	*Standards for Security Categorization of Federal Information and Information Systems*
NFS 1852.204-76	*Security Requirements for Unclassified Information Technology Resources (May 2007)*
NPR 2810.1	*Security of Information Technology*
NIST SP 800-18	*Guide for Developing Security Plans for Federal Information Systems*
NIST SP 800-26	*Security of Self-Assessment Guide for Information Technology Systems*
NIST SP 800-30	*Risk Management Guide for Information Technology Systems*
NIST SP 800-34	*Contingency Planning Guide for Information Technology Systems*

15.3 **CONTENTS**: In response to the requirements of NFS 1852.204-76, the IT Security Requirements Compliance Document shall include the IT system name, the Security Category per FIPS 199 assessment, key IT security personnel contact information, dates of completion of the IT System Security Plan document prepared per NIST SP 800-18 and its annual review and update per NIST SP 800-26 and FIPS 200; Risk Assessment report prepared per NIST SP 800-30 and its annual update; and approval by Organization Senior Management for the IT system to operate. It shall identify the Contingency Plan document per NIST SP 800-34 and the date of completion of the annual "Classroom Exercises"; policies and procedures for Incident Response and Annual IT security training. It shall include a statement of compliance of providing NASA access to the Contractor's and subcontractors' facilities, installations, operations, documentation, databases, and personnel used in performance of the contract; ensuring contractor system administrator have demonstrated appropriate knowledge; completing contractor personnel screening requirement and the inclusion of NFS 1852.204-76 in all subcontracts, as required. The statement of compliance shall be signed by Organization Senior Management responsible for IT ensuring that the requirements have been met.

When the Contractor is located at a NASA Center or installation or is using NASA IP address space, the IT Security Requirements Compliance Document shall also identify the processes for submitting requests for non-NASA provided external Internet connections to the Contracting Officer for approval by the NSCCB, compliance with NASA CIO metrics and the utilization of the NASA Public Key Infrastructure.

15.4 **FORMAT**: The Information Technology Security Requirements Compliance Document format shall use the MSFC IT Security Requirements Compliance Document template. The template shall be provided by the MSFC IT Security Office (IS10).

15.5 **MAINTENANCE**: Changes shall be incorporated by complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145CD-003**
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**: JP30
10. **DISTRIBUTION**: Per Contracting Officer's letter
11. **INITIAL SUBMISSION**: Per Data Requirements Matrix
12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix
13. **REMARKS**: Copies of NASA Form 1679 and the NTSR may be obtained and/or filled out at: http://www.ott.nasa.gov/. These forms may also be obtained from the New Technology Representative (mailto:Carolyn.F.McMillan@nasa.gov).
14. **INTERRELATIONSHIP**: SOW paragraphs 5.3, 6.3, 7.3, 8.3 and 9.3
15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Technology Reports include technical detail as is necessary to identify and fully describe a "Reportable Item". Per NFS 1852.227-70, "Reportable Item" means any invention, discovery, improvement, or innovation of the contractor, whether or not the same is or may be patentable or otherwise protectable under Title 35 of the United States Code, conceived or first actually reduced to practice in the performance of any work under this contract or in the performance of any work that is reimbursable under any clause in this contract providing for reimbursement of costs incurred prior to the effective date of this contract.

15.2 **APPLICABLE DOCUMENTS**:

NFS 1852.227-70 New Technology Clause

DRD Continuation Sheet

TITLE: Technology Reports **DRD NO.**: **1145CD-003**
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 NFS 1852.227-70 (e)(2), the disclosure to the agency shall be in the form of a written report and shall identify the contract under which the reportable item was made and the inventor(s) or innovator(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 physical, chemical, biological, or electrical characteristics of the reportable item. The disclosure shall also identify any publication, on sale, or public use of any subject invention and whether a manuscript describing such invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to the agency, the Contractor shall promptly notify the agency of the acceptance of any manuscript describing a subject invention for publication or of any on sale or public use planned by the Contractor for such invention. This reporting requirement may be met by completing NASA Form 1679 (latest revision) in hardcopy or online at: http://www.webnitre.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?

DRD Continuation Sheet

TITLE: Technology Reports **DRD NO.: 1145CD-003**
DATA TYPE: 3 **PAGE**: 3/3

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

(c) Previously copyrighted (if so, by whom?)?
(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 (NTSR): This report shall consist of a listing of reportable items for the reporting period or certification that there are none. This report shall also contain a list of subcontracts containing a patent rights clause or certification that there were no such subcontracts. Completion of the Interim NTSR 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 (NTSR): This report shall consist of a comprehensive list of all reportable items for the contract duration or certification that there are none. This report shall also contain a list of subcontracts containing a patent rights clause or certification that there were no such subcontracts. Completion of the Final NTSR 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. Subcontracts: The contractor shall provide copies of subcontracts containing a patent rights clause upon Contracting Officer's request.

15.4 **FORMAT**: The Disclosure of Invention and New Technology (Including Software) report may use NASA Form 1679 (latest version) 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 Summary Reports may use the 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.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145CM-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 the intended use.

8. **OPR**: EV60/JP30 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraphs 4.3, 5.3, 6.3, 7.3, 8.3, 9.3, 13.3 and 13.4

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Acceptance Data Package (ADP) contains the elements of documentation required to establish the acceptability of equipment, flight hardware and software.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: An ADP for hardware contract configuration items shall contain the current log book that includes:

a. Running/operating time and cycle for each time and cycle critical items of the Configuration Item (CI). These logs shall identify the item(s) by nomenclature, part number, and serial number and shall state the total authorized life and the life expended.
b. Test history log, including post manufacturing checkout and final verification tests of the CI, with the following data:
    1. Actual measurements identified to specified tests. Reference to applicable test reports are satisfactory provided that copies of the reports are provided.
    2. Brief test summary.
    3. List of unaccomplished tasks and estimated man-hours to complete.
    4. List of actual and recommended retest.
    5. Special test instructions, investigations, warnings, and problems encountered during test.
    6. Failure and corrective actions data for all failures during all testing.
c. Inspection records for all inspections.
d. Transfer records providing a history of all CI and critical component movements.
e. Alignment data for all CIs and critical items.
f. Component log books, including Government furnished items.
g. Weight and balance logs covering total weight and horizontal, vertical, and lateral center(s) of gravity.
h. Acceptance Readiness Certification.
i. Quality Certification.

DRD Continuation Sheet

TITLE: Acceptance Data Package **DRD NO.: 1145CM-001**
DATA TYPE: 1 **PAGE**: 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

j. Calibration/Checkout.
k. Repair limitations.
l. Temporary installations.
m. Certification of Flight Readiness (Pre-endorsement Form); Material review actions.
n. As-built configuration (shop traveler).
o. Refurbishment history.
p. Identify and provide documentation for miscellaneous equipment items to be delivered to and accepted by the government other than end items (Equipment Parts Tag (Miscellaneous Items)) to include:
   1. Part Name.
   2. Part Number.
   3. Serial/Lot Number.
   4. Quantity.
   5. Drawing Rev Letter.
   6. Incorporated EO Numbers.
   7. Acceptance approval signature (name and organization).
q. Configuration Records:
   1. Parts and drawing list identifying all parts and incorporated or pending changes to each.
   2. Software configuration records defining the verified and validated software, version description documents, software certification, and the validated software program.
   3. List of approved and pending deviations and waivers.
   4. Complete list of hardware and software/firmware items shipped loose or separately.
   5. Copy of proposed DD Form 250.
r. Equipment Log Book shall document activities and operations performed on deliverable hardware containing the information identified in MSFC Form 3473 or equivalent with MSFC approval.

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: The ADP shall be maintained current. Changes and/or updating shall be in accordance with the contractor's approved change control system.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145CM-002**
3. **DATA TYPE**: 1
4. **DATE REVISED**:
5. **PAGE**: 1/1
6. **TITLE**: Deviation/Waiver Approval Request
7. **DESCRIPTION/USE**: Deviation: A specific written authorization granted before the fact to depart from a particular Government-controlled requirement for a limited application. Waiver: A specific written authorization accepting a departure after occurrence from a Government-controlled requirement for a limited application.
8. **OPR**: EV60 9. **DM**: JP30
10. **DISTRIBUTION**: Per Contracting Officer's letter
11. **INITIAL SUBMISSION**: Per Data Requirements Matrix
12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix
13. **REMARKS**:
14. **INTERRELATIONSHIP**: SOW paragraphs 4.3, 5.3, 6.3, 7.3, 8.3 and 9.3
15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Deviation/Waiver Approval Request (DAR) requests approval to depart from a Government-controlled requirement.

15.2 **APPLICABLE DOCUMENTS**:

MSFC-STD-3394 *Standard for Contractor Configuration Management, MSFC Programs/ Projects*

15.3 **CONTENTS**: DARs shall be prepared as specified in MSFC-STD-3394. The Program Control Number (PCN), as assigned by MSFC, and the DAR number assigned by the contractor shall be shown on all forms.

15.4 **FORMAT**: MSFC Form 847, "Deviation/Waiver Approval Request (DAR)" or equivalent, shall be used to document deviations/waivers.

15.5 **MAINTENANCE**: All requested changes to a DAR require submittal of a DAR revision.

15.6 **APPROVAL OF DEVIATIONS/WAIVERS**: Receipt of contractual approval from the procuring activity shall constitute the sole authority for the contractor to effect a DAR. This approval will be noted by disposition notation and the authorizing signature on the MSFC Form 847, or equivalent.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145CM-003**
3. **DATA TYPE**: 1
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Engineering Change Proposals (ECP) and Associated Documentation

7. **DESCRIPTION/USE**: To propose changes to and support the review of Government controlled configuration documentation, e.g., engineering changes to drawings, parts lists, specifications, software requirements documents, and interface control documents.

8. **OPR**: EV60/JP30 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: DRDs 1145CM-004, *Configuration Management Plan* and 1145SE-003, *Interface Control Document*. SOW paragraphs 5.3, 6.3, 7.3, 8.3 and 9.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: To describe proposed changes with supporting rationale to Government-controlled configuration documentation.

15.2 **APPLICABLE DOCUMENTS**:
MSFC-STD-3394 *Standard for Contractor Configuration Management, MSFC Programs/Projects*

15.3 **CONTENTS**: The requirements of MSFC-STD-3394 shall be used in the preparation of proposed changes to Government-controlled configuration documentation.

a. The following MSFC forms or equivalent shall be prepared as required to define the specific requirements for a proposed change.
   1. Engineering Change Proposals (ECPs) - MSFC Form 2348, or equivalent.
      Appropriate information shall be provided for each block on the ECP and yes/no questions will be answered with either a yes or no.
   2. Interface Revision Notices (IRNs) - MSFC Form 4229.
      IRNs are to be coordinated with affected associate contractor early in the change cycle, and a coordinated IRN is to be submitted with each proposed ECP affecting an ICD.

b. Changes to specifications, documents, drawings and parts lists shall be provided in From/To or Was/Is format so that the change is clearly defined and included with the submittal of the ECP.

c. Field Engineering Changes (FEC) shall be prepared and processed in accordance with the appropriate field site format and instructions. Format and processing instructions for specific sites may be obtained from MSFC CM Office Representative.

The program control number (PCN) (or its equivalent) assigned by MSFC and the proposal number assigned by the contractor shall be shown on all forms and messages.

DRD Continuation Sheet

TITLE: Engineering Change Proposals (ECP) and Associated Documentation **DRD NO.:** **1145CM-003**

DATA TYPE: 1 **PAGE:** 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED):**

15.4 **FORMAT**: The formats shall be as defined in paragraph 15.3.

15.5 **MAINTENANCE**:

a. ECP maintenance shall be accomplished by complete revision.
b. IRNs shall be a complete reissue.

15.6 **MSFC APPROVALS**:

a. Receipt of contractual approval shall constitute the sole authority for the contractor to affect a Class I engineering change.
b. Changes to documentation shall be approved as a part of the ECP.
c. IRNs shall be approved as part of the ECP.

The contractor shall prepare and submit ECPs when requested by MSFC to implement a Government-directed change.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145CM-004**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/1
6. **TITLE**: Configuration Management Plan
7. **DESCRIPTION/USE**: To describe the contractor's method for accomplishing the configuration management requirements of the contract and to describe the contractor's approach and method for transition of the NASA design configuration to the contractor configuration control system including manufacturing and product certification.
8. **OPR**: EV60/JP30 9. **DM**: JP30
10. **DISTRIBUTION**: Per Contracting Officer's letter
11. **INITIAL SUBMISSION**: Per Data Requirements Matrix
12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix
13. **REMARKS**:
14. **INTERRELATIONSHIP**: SOW paragraph 4.3
15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Configuration Management Plan describes the functions, responsibilities, and authority for the accomplishment and implementation of hardware, firmware and software configuration management to be performed during the hardware and software life cycles. This plan identifies the required coordination of configuration management activities with other activities of the project. This plan also identifies the tools and the physical and human resources required for the execution of the plan. This plan describes transition of the NASA Design Team configuration data to the contractor's CM system.

15.2 **APPLICABLE DOCUMENTS**:

MSFC-STD-3394	*Standard for Contractor Configuration Management, MSFC Programs/Projects*
CxP 72015	*Exploration Launch Projects Configuration Management Plan, US CM Appendix*

15.3 **CONTENTS**: The CMP shall provide the information defined in MSFC-STD-3394, Appendix A and B and CxP 72015 to include schedule information, which establishes the sequence and coordination for the identified activities and for all events affecting the Plan's implementation and release management and delivery.

15.4 **FORMAT**: Contractor format is acceptable with MSFC approval.

15.5 **MAINTENANCE**: Changes shall be incorporated by complete reissue. Update as required to maintain current with program changes.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145CM-005**
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 Physical Configuration Audit (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**: EV60/JP30 9. **DM**: JP30

10. **DISTRIBUTION**: See Attachment 2

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**: MSFC will document audit planning and provide it to the contractor prior to the audit.

14. **INTERRELATIONSHIP**: SOW paragraphs 5.3, 6.3, 7.3, 8.3 and 9.3

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**: 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.:** **1145CM-005**

DATA TYPE: 2/3 **PAGE:** 2/4

15. **DATA PREPARATION INFORMATION (CONTINUED):**

c. 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.

d. 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.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145CM-006**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/1
6. **TITLE**: Data Accession List
7. **DESCRIPTION/USE**: To provide an index and status of contractor controlled documentation.
8. **OPR**: EV60/JP30 9. **DM**: JP30
10. **DISTRIBUTION**: Per Contracting Officer's letter
11. **INITIAL SUBMISSION**: Per Data Requirements Matrix
12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix
13. **REMARKS**:
14. **INTERRELATIONSHIP**: SOW paragraph 4.3
15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Data Accession List shall be a cumulative listing of contractor generated documentation and shall identify data generated to date, as well as data released during the past month, and data submitted to NASA/MSFC.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Data Accession List shall reflect available Type 1, 2, 3, and 4 information and describe procedures for obtaining the listed information. This information shall include all data requirement response documentation plus all other project pertinent documents, and a forecast of any deliverables for the next reporting period. The list shall include the related Work Breakdown Structure (WBS) number and document identification (applicable DRD number, document number, title, date, and revision).

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: None

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145CM-007**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/3
6. **TITLE**: Engineering Drawings and Associated Lists

7. **DESCRIPTION/USE**: To provide engineering data defining the design to the extent required to support system design, manufacturing, test, and logistics support of the vehicle and required spare parts. Engineering drawings and associated lists shall be sufficient to depict the detailed configuration of all system, subsystem, and component levels and to include ground support equipment (GSE) and airborne support equipment (ASE). 2D and 3D CAD models shall be submitted as supplemental information.

8. **OPR**: EV60/JP30 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraphs 4.3, 5.3, 6.3, 7.3, 8.3 and 9.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: Engineering drawings disclose (directly or by reference) the physical and functional requirements of an item by means of graphics or textual presentation or combinations of both, as supplemented by 3D models.

15.2 **APPLICABLE DOCUMENTS**:

ASME Y14.100	*Engineering Drawing Practices*
ASME Y14.41	*Digital Product Definition Data Practices*
ASME Y14.5M	*Dimensioning and Tolerancing*
MIL-STD-961	*Department of Defense Standard Practices, Defense Specifications*

15.3 **CONTENTS**: Requirements:

a. Part I - Engineering drawings and associated lists shall meet the requirements of ASME Y14.100. Geometric Dimensioning and Tolerancing shall be implemented in accordance with ASME Y14.5M. 2D/3D CAD shall meet the requirements of ASME Y14.41. Engineering drawings and associated lists of end items, elements and/or all components and assemblies shall be provided to define the details necessary for the manufacture, test, inspection, operations and logistic support of the system. This definition shall:

1. Reflect the end-product at its current level of design maturity.
2. Provide the engineering data for logistics support products.
3. Provide the necessary data to permit manufacture and/or acquisition of items identical to the original item(s).
4. Document directly or by reference the following:
   (a) Details of unique processes (i.e., not published or generally available to industry) when essential to design and manufacture.
   (b) Performance ratings.

DRD Continuation Sheet

TITLE: Engineering Drawings and Associated Lists DRD NO.: 1145CM-007
DATA TYPE: 3 PAGE: 2/3

15. DATA PREPARATION INFORMATION (CONTINUED):

(c) Dimensional and tolerance data (Geometric Dimensioning and Tolerancing (GDT) shall be required between all external and major internal interfaces).
(d) Critical manufacturing processes and assembly sequences, and rigging procedures.
(e) Diagrams.
(f) Mechanical and electrical connections.
(g) Physical characteristics, including form and finish.
(h) Details of material identification, including heat treatment and protective coatings.
(i) Inspection, test, and evaluation criteria.
(j) Equipment calibration requirements.
(k) Quality assurance requirements.
(l) Hardware marking requirements.
(m) Requirements for reliability, maintainability, environmental conditions, shock, and vibration testing and other operational or functional tests.

5. Limited rights-in-data items - Engineering drawings for items which the Government does not have unlimited rights in data shall specify the form, fit, and function requirements of the item and conform to the requirements for a control drawing as defined in ASME Y14.100 or a specification prepared in accordance with the requirements of MIL-STD-961.

b. Part II - Cable interconnect diagrams (CID's), electrical system schematics, and wiring lists. Cable interconnect diagrams, electrical system schematics, wiring lists, and fluid system schematics shall be prepared in accordance with ASME Y14.100. Part I drawings shall be utilized to the maximum extent possible in providing the design definition. The drawings shall include the following:

1. Cable interconnect diagrams shall show graphically the arrangement of external electrical cabling which interconnects electrical assemblies and/or equipment. The CID shall show all cable runs and terminations; each cable shall be identified by reference designation number. The connector short sign shall be identified.
2. Electrical system schematics shall illustrate and describe circuit items with symbols placed such that a circuit may be traced from item to item in the sequence of its function. The placement and arrangement of these circuits shall follow a logical sequence of presentation to provide a clear description of the distribution.
3. Component Level Documentation - Schematics and/or wiring lists for components, including interconnecting cable harnesses, shall be provided.
4. Overall Grounding Documentation - The grounding schematic shall show the details of all grounds and power returns from source to loads. All connections shall be shown. It shall also show details of all Electrical Ground Support Equipment interconnections to facility and safety grounds.
5. The Fluid system schematic shall illustrate and describe all components with symbols and flow designators such that the fluid system may be traced from component to component (such as pumps, valves, meters, regulators, and filters). The schematics shall document the range requirements (flow, temperature, and pressure) for all component external interfaces and line sizes. The placement and arrangement of these components shall follow a logical sequence of presentation to provide a clear description of the flow of fluids in the system. The schematics shall reference engineering drawings and associated lists for configuration details.

DRD Continuation Sheet

TITLE: Engineering Drawings and Associated Lists **DRD NO.: 1145CM-007**
DATA TYPE: 3 **PAGE**: 3/3

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

15.4 **FORMAT**: Format of engineering drawings shall be in accordance with ASME Y14.100. Drawings shall be delivered in PDF format. 2D/3D CAD shall be in accordance with ASME Y14.41, in the format specified by the Government, fully parametric and associative. The contractor shall deliver ProEngineer compatible 3D models of the components. Alternate formats may be acceptable upon negotiation. All documentation/data shall include the contractor's CAGE code and document numbers. The Contractor may submit electronic files of drawings and CAD models via CD, DVD, or direct electronic transfer (Product Data Management (PDM) Tool, FTP, etc.) as specified by the Government.

For all binary deliveries the contractor shall include a listing of the creating environment to include:

a. CAD product name/version/patches.
b. Subordinate (plug-in) software/version/patches.
c. Description of hardware.
d. Operating system/version/patches.

15.5 **MAINTENANCE**: All documents produced under this DRD must be maintained current. Changes to and/or updating of engineering drawings and associated lists shall be in accordance with the contractor's approved drawing system and the provisions herein. Changes to engineering drawings under the Government's Class I change control shall be submitted by Engineering Change Proposal. The contractor shall maintain the capability to restore and modify any engineering data used in the design through the project lifecycle.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145CM-008**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/1
6. **TITLE**: Specification and Drawing Trees
7. **DESCRIPTION/USE**: To provide a categorized listing of documents required for development, design, production, testing, qualification, and design evolution of a Contract End Item. Specification and Drawing Trees establish the content, format and maintenance requirements for displaying the subordinated relationship of documentation, specifications and drawings. A specification tree is a generation breakdown of the specifications with interrelationships, as applicable, to the configuration items. A drawing tree is a generation breakdown of the engineering drawings that depicts the allocation of requirements of the configuration item specification.
8. **OPR**: EV60/JP30 9. **DM**: JP30
10. **DISTRIBUTION**: Per Contracting Officer's letter
11. **INITIAL SUBMISSION**: Per Data Requirements Matrix
12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix
13. **REMARKS**:
14. **INTERRELATIONSHIP**: SOW paragraphs 4.3, 5.3, 6.3, 7.3, 8.3 and 9.3
15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: Specification and Drawing Trees depict the hardware and software configuration items in top down, or generation breakdown form. Specification and Drawing Trees establish the content, format and maintenance requirements for displaying the subordinated relationship of documentation, specifications and drawings.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The specification and drawing trees shall consist of an indentured or generation breakdown listing of all specifications or drawings applicable to a configuration item or items.

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: Changes shall be incorporated by complete reissue or change page if hard copy is necessary.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-001**
3. **DATA TYPE**: 1
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Electrical, Electronics, and Electromechanical Nonstandard Parts Approval Request

7. **DESCRIPTION/USE**: To identify and provide rationale for joint Government and contractor approval of nonstandard electrical, electronic, and electromechanical (EEE) parts as defined in MSFC-STD-3012.

8. **OPR**: EI42 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION** Per Data Requirements Matrix.

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraph 9.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The EEE Nonstandard Parts Approval Request provides the means for requesting approval to use nonstandard electrical, electronic, and electromechanical parts in the system design.

15.2 **APPLICABLE DOCUMENTS:**

MSFC-STD-3012 *EEE Parts Management and Control for MSFC Space Flight Hardware*

15.3 **CONTENTS**: The EEE Nonstandard Parts Approval Request shall use MSFC-STD-3012 as a guide and shall conform to the following:

Part 1: Initial Nonstandard Part Usage Request

The purpose of Part 1 is to coordinate approval to use nonstandard EEE parts. The nonstandard parts usage request shall contain the following information:

a. Unique document control number.
b. Equipment identification including name, serial number, and part number. The part number shall include configuration information.
c. Equipment function and criticality.
d. Supplier, subcontractor, and effectivity.
e. Subassembly nomenclature, part number, and serial number, if applicable.
f. Nonstandard EEE part number, part manufacturer and specification number, part name, part type, and common designation.
g. Salient differences including source control documentation, traceability, quality requirements, and screening and burn-in between design baseline and nonstandard parts.
h. Qualification status and test plan.
i. Details of limited life item parts.
j. Justification for use of the nonstandard part including technical inadequacies.
k. Details of extended life item parts.
l. Vendor approval plan.

DRD Continuation Sheet

TITLE: Electrical, Electronic, and Electromechanical Nonstandard Parts Approval Request **DRD NO.:** **1145DE-001**

DATA TYPE: 1 **PAGE:** 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED):**

Part 2: EEE Drawings and Specifications

The purpose of Part 2 is to describe performance, design, qualification, and quality assurance requirements for EEE parts specified in the end item design. The drawings and specifications shall delineate the following:

a. Complete identification of the part including generic equivalent, physical, environmental, and performance requirements including inspections and tests for qualification, acceptance, and lot samplings where required and packaging, storage, and handling requirements.
b. Detailed cross-reference to all other applicable specifications for those part types where a combination of specifications is used to provide all of the requirements for a single part type.
c. Unique number to identify each EEE part drawing/specification which is subject to formal change control.
d. Seller-originated requirements documents which are incorporated into the part specification. (These shall be submitted along with the part specification.)
e. Applicable military specifications and appropriate paragraphs. (These shall be available on request.)
f. Exceptions to referenced military specifications.

Part 3: EEE Part Qualification Test Report

To document each nonstandard part qualified by test to its specification, the EEE Part Qualification Test Report shall contain the following:

a. Reference to related qualification test plan and description of test.
b. Sample size, measurements taken, test procedures, sequence, equipment used, and acceptance criteria.
c. Identification of measurements outside acceptable criteria, identification of all failures, and failure analysis.
d. Statement as to successfulness of test, and qualification is applicable.
e. Reference to the controlling specification to which the qualification is applicable.
f. Comparison of worst-case application requirements to qualification requirements including the basis of parametric drift over extended life, where applicable.

15.4 **FORMAT**: Use of MSFC Form 4346 (February 1998) or contractor format is acceptable. Nonstandard part approval requests shall include all information specified on MSFC Form 4346 (February 1998). Data shall be delivered by hard copy and electronic media.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue. Not applicable to Part 3.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-002**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/1

6. **TITLE**: Electrical, Electronics, and Electromechanical (EEE) Part Control Plan

7. **DESCRIPTION/USE**: The plan shall define the contractor's planned methods of accomplishing the tasks required to satisfy the EEE parts program requirements.

8. **OPR**: EI42 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraph 9.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The EEE Parts Control Plan describes the contractor's approach to accomplishing the electrical, electronic, and electromechanical parts control program requirements and tasks.

15.2 **APPLICABLE DOCUMENTS**:
MSFC-STD-3012 *EEE Parts Management and Control for MSFC Space Flight Hardware*

15.3 **CONTENTS**: The EEE Parts Control Plan shall use MSFC-STD-3012 as a guide and include the following:

a. Description of tasks to be accomplished including programmatic tasks, special studies, and support tasks.
b. Task matrix defining primary and support organization responsibilities.
c. Identification of formats and ground rules to be used in analysis tasks.
d. Methods of implementation of tasks.

15.4 **FORMAT**: Contractor format is acceptable. Data shall be delivered by hard copy and electronic media.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-003**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/2
6. **TITLE**: Programmable Devices Development Plan

7. **DESCRIPTION/USE**: To describe a plan for conducting the development and configuration management effort for programmable devices, including as Field Programmable Gate Arrays (FPGAs), Application Specific Integrated Circuits (ASICs), Programmable Logic Devices (PLDs), and Programmable Read-Only Memories (PROMs).

8. **OPR**: EI31 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**: The term "development" is used to include new developments, modifications, reuse, reengineering, maintenance, and all other activities leading to the incorporation of programmed logic devices.

14. **INTERRELATIONSHIP**: SOW paragraph 9.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Programmable Devices Development Plan provides insight into the processes to be for programmable device development from initial design through configuration of the physical device. This plan includes techniques for configuration management of both the design and the physical device.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Programmable Devices Development Plan shall contain:

a. Project organizational structure showing authority and responsibility of each organization unit, including design organizations, manufacturing organizations, and Safety & Mission Assurance.
b. Types of programmable devices (i.e. FPGA, ASIC, etc.) to be included in the design.
c. Development tools and languages.
d. Use or reuse of commercial, proprietary, or licensed design elements.
e. Configuration management of the design for each device including:
    1. Configuration identification.
    2. Configuration control.
    3. Security and data integrity.
    3. Release management and delivery.
    4. Version Control.
    5. Nonconformance control and change processes.
f. Design verification.
g. Procedures for loading the design into the programmable device.
h. Physical device testing.

DRD Continuation Sheet

TITLE: Programmable Devices Development Plan **DRD NO.**: **1145DE-003**
DATA TYPE: 2 **PAGE**: 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

15.4 **FORMAT**: Contractor format is acceptable.

15.5 **MAINTENANCE**: Changes shall be incorporated by change pages or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-004**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/1

6. **TITLE**: As-Designed EEE Parts List

7. **DESCRIPTION/USE**: To provide a summary of as-designed electrical, electronic, and electromechanical (EEE) parts usage with "where-used" and qualification information of designs released for production.

8. **OPR**: EI42 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraph 9.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The As-Designed EEE Parts List identifies electrical, electronic, and electromechanical parts used in contractor, subcontractor, supplier, and in-house equipment designs.

15.2 **APPLICABLE DOCUMENTS**:
MSFC-STD-3012 *EEE Parts Management and Control for MSFC Space Flight Hardware*

15.3 **CONTENTS**: The As-Designed EEE Parts List shall use MSFC-STD-3012 as a guide and include the following for each EEE part number used:

a. Deliverable end item or equipment identification (part number).
b. EEE part type.
c. EEE part number.
d. EEE part specification.
e. Generic EEE part number.
f. EEE part qualification method and status.
g. Nonstandard EEE part approval status.
h. Identification of EEE part manufacturer [QML, QPL, name, or CAGE code (preferred)].
i. Quantity of EEE part used in equipment (estimated).
j. Indication that item is a change from the previous submission.

15.4 **FORMAT**: Contractor format is acceptable. Data shall be submitted by hard copy and electronic media.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-005**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/1
6. **TITLE**: Fracture Control Plan
7. **DESCRIPTION/USE**: To provide a plan for contractor compliance with requirements for fracture control.
8. **OPR**: EM20 9. **DM**: JP30
10. **DISTRIBUTION**: Per Contracting Officer's letter
11. **INITIAL SUBMISSION**: Per Data Requirements Matrix
12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix
13. **REMARKS**:
14. **INTERRELATIONSHIP**: SOW paragraph 4.2
15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Fracture Control Plan defines elements of the fracture control program.

15.2 **APPLICABLE DOCUMENTS**:

MWI 8071.1	*Fracture Control Board*
NASA-STD-5009	*Nondestructive Evaluation Requirements for Fracture Control Programs (release pending, will replace MSFC-STD-1249)*
NASA-STD-5019	*Fracture Control Requirements for Spaceflight Hardware*
NASA-HDBK-5010	*Fracture Control Implementation Handbook for Payloads, Experiments and Similar Hardware*

15.3 **CONTENTS**: The Fracture Control Plan shall define the elements of the fracture control program and responsibilities for managing them. The requirements for the Fracture Control Plan are defined in MWI 8071.1 and NASA-STD-5019. Further information and examples are found in NASA-HDBK-5010 and NASA-STD-5009.

15.4 **FORMAT**: Contractor format is acceptable. The plan shall be available in an electronic database.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-006**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Fracture Control Reports Inputs

7. **DESCRIPTION/USE**: To demonstrate that the hardware meets the fracture control requirements.

8. **OPR**: EM20 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraphs 5.3, 6.3, 7.3, 8.3 and 9.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Fracture Control Reports Inputs provide data to confirm that hardware meets fracture control requirements.

15.2 **APPLICABLE DOCUMENTS**:

MWI 8071.1	*Fracture Control Board*
NASA-STD-5009	*Nondestructive Evaluation Requirements for Fracture Control Programs*
NASA-STD-5019	*Fracture Control Requirements for Spaceflight Hardware*

15.3 **CONTENTS**: Fracture Control Reports Inputs shall be prepared in accordance with NASA-STD-5009, MWI 8071.1, and NASA-STD-5019 and describe fracture control analysis results that demonstrate that fracture control requirements are met. The hardware manufacturer shall provide the following input to the Fracture Control Report for each fracture sensitive part requiring flaw screening.

a. Report of fracture control analytical and nondestructive evaluation (NDE) results for the assembly and subassembly. This report shall include:
   1. Part name.
   2. Part number.
   3. Material (generic name) and condition.
   4. Type of NDE performed.
b. Keyed diagrams and sketches that show flaw locations and part dimensions.
c. List of the accumulated loads for fracture critical parts.*
d. Results of flaw screening (NDE and proof testing), as applicable.*
e. Results of damage tolerant testing of fracture critical parts, as applicable.*
f. Rationale for acceptance of any detected flaws, as applicable.*

* May reference hardware related documents or other available documents serving as data requirements.

15.4 **FORMAT**: Contractor format is acceptable. Reports shall be available in an electronic database.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP 2. **DRD NO.**: **1145DE-007**
3. **DATA TYPE**: 2 4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Structural Dynamics Analyses, Loads and Models Documentation

7. **DESCRIPTION/USE**: To define the structural dynamics analyses, loads, and models to be used for the design of the flight article and its associated equipment

8. **OPR**: EV31 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**: Reference is made to NASA-HDBK-7005, *Dynamic Environmental Criteria*, NASA-STD-5002, *Loads Anlayses of Spacecraft and Payloads* and Memorandum ED21-02-022, *Transportation and Handling Limt Load Accelerations.*
14. **INTERRELATIONSHIP**: SOW paragraph 4.2, 5.3, 6.3, 7.3, 8.3, and 9.3

15. **DATA PREPARATION INFORMATION**:
15.1 **SCOPE**: The Structural Dynamics Analyses, Loads and Models Documentation defines the structural loads to be used for the design of the spacecraft flight and test articles and its associated equipment.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Structural Dynamics Analyses, Loads, and Models Documentation shall consist of:
Structural Dynamic Analyses Reports - These reports shall describe the structural dynamic response and loads analyses conducted on the flight article, its systems, subsystems, and components to calculate stresses and/or to identify operational limits and restrictions. Assumptions, boundary conditions, applied environments for response analyses, rationale, appropriate results, Campbell or resonance diagrams for normal modes, characterized modal parameters for response analyses, plots of modes, and proper reference of models shall be provided. Environments used for response analyses shall include all vibration, shock, and mechanical induced environments including pressure fluctuations due to flow induced vibrations, cross correlated pressure measurements that occur during the combustion process, and vibroacoustics phenomena. Vibroacoustic environments to be used for range safety, transportation, hardware qualification, and workmanship screening should also be provided.
Loads - A structural loads data book shall be generated and kept current and approved by MSFC. All significant loads encountered during the service life, from manufacturing to end of service, static, dynamic, steady state, and transient loads shall be documented. Load combinations which occur simultaneously shall be defined.
Models - The structural math models used for loads and dynamics response analyses shall be documented and in accordance with NASA-STD-5002, and made available upon request. Verification, validation, and accreditation of models shall be included in the documentation as applicable. Model description shall indicate pertinent modeling parameters, model display, material properties used, and type of model. A list and scope of the structural math models shall be proposed by the contractor and approved by MSFC.

DRD Continuation Sheet

TITLE: Structural Dynamics Analyses, Loads and Models Documentation **DRD NO.**: **1145DE-007**

DATA TYPE: 3 **PAGE**: 2/2

15.3 **DATA PREPARATION INFORMATION (CONTINUED)**:

15.4 **FORMAT**: For reports and data book, compatible electronic contractor format is acceptable. For models, NASTRAN .bdf format, which can be augmented with MSC/PATRAN .db format, is preferred with electronic delivery.

15.5 **MAINTENANCE**: Changes shall be incorporated by complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-008**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Thermal Design Data Book

7. **DESCRIPTION/USE**: To support NASA in the development and maintenance of the Thermal Design Data Book, (TDDB) which evolves as the design matures and eventually documents all details of the Upper Stage thermal design. The TDDB is a comprehensive source of information for all aspects of the thermal design, analysis, test, and verification. The customer shall use this data as the primary source to review and evaluate the thermal design for approval to proceed to the next development phase.

8. **OPR**: EV34/ER43/EI13 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**: Documents referenced in the Thermal Design Data Book shall already be available or provided as an appendix or separate document.

14. **INTERRELATIONSHIP**: SOW paragraph 4.2

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Thermal Design Data Book describes the thermal requirements, design requirements, including electronic power dissipations and temperature allowables, thermal interfaces, materials, thermal properties, and system architecture of the integrated Upper Stage.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Thermal Design Data Book contains the following:
The Thermal Design Data Book shall be a compilation of Upper Stage design criteria, thermal environments, electronic thermal power dissipations, component temperature limits, materials and material properties, a summary of component thermal response and thermal protection (TPS) design thickness to meet requirements. Detailed thermal analysis assumptions (properties, environments and geometries), thermal model general descriptions and thermal analysis results shall be documented in separate reports, but listed as references and included as a living appendix in the TDDB. The purpose of the TDDB shall be to present, in abridged form, information from these detailed analytical reports necessary for the reader to understand the thermal response of the upperstage when subjected to natural and induced thermal environments for all mission phases, e.g. prelaunch, ascent, and re-entry. An abbreviated Verification Requirements Compliance Matrix containing applicable thermal requirements shall also be included.

DRD Continuation Sheet

TITLE: Thermal Design Data Book **DRD NO.: 1145DE-008**

DATA TYPE: 3 **PAGE**: 2/2

15.3 **DATA PREPARATION INFORMATION (CONTINUED)**:

Material thermal physical properties to be documented shall include temperature dependent density, conductivity, and specific heat with consideration given to virgin and char states. TPS surface optical properties characterization shall include spectral absorptivity, emissivity, and transmissivity, if applicable. TPS cold wall environment correlated recession data shall be characterized and provided for all TPS materials. Material thermal physical properties shall be documented in a subsection of the Data Book reserved for thermal physical properties data.

References to the natural and induced environments used shall be documented. This shall include pre-launch and aeroheating environments. Provide the thermal model(s) and any necessary associated files in electronic format. Reference will be made to any Computer Aided Design (CAD) drawings used in thermal modeling

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.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-009**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Structural Assessment Plan

7. **DESCRIPTION/USE**: To enable the Government to assure compliance with Upper Stage requirements for strength and fatigue analyses, tests, and structural assessment.

8. **OPR**: EV31/ER41 9. **DM:** JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix)

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraphs 6.3, 7.3 and 8.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Structural Assessment Plan describes contractor compliance with Upper Stage requirements for strength and fatigue analyses, tests, and structural assessment.

15.2 **APPLICABLE DOCUMENTS**:

NASA-STD-5001	*Structural Design and Test Factors for Safety for Space Flight Hardware*
NASA-STD-5005	*Ground Support Equipment*
NASA-STD-5012	*Strength and Life Assessment Requirements for Space Propulsion System Engines*
MSFC-HDBK-505B	*Structural Strength Program Requirements*
ANSI/AIAA S-80	*Space Systems – Metallic Pressure Vessels, Pressurized Structures, and Pressure Components*
ANSI/AIAA S-81	*Space Systems – Composite Overwrapped Pressure Vessels (COPVs)*
CxP 70135	*Constellation Program Structural Design and Verification Requirements*

NOTE: Reference Table 1 for applicability information.

15.3 **CONTENTS**: The Structural Assessment Plan shall be prepared in accordance with the applicable structural requirements documents (see Table 1) referenced in section 15.2 and describe how the contractor intends to comply with the Upper Stage structural strength program requirements. The plan shall identify the organization responsible for the structural analyses, tests, and assessment tasks; define satisfactory results; and include a schedule for completion. The plan shall distinguish between flight and development hardware, identify components that require design verification tests and proof tests, specify appropriate test levels and environments, and state the means of correlating test data with analyses.

15.4 **FORMAT**: Contractor format is acceptable. The plan shall be available in an electronic database.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

Table 1 - Applicability Information

Structural System	Applicable Requirement*	Comments
Space Propulsion System Engines	NASA-STD-5012	This document is only applicable to liquid fueled engines.
Ground Support Equipment	NASA-STD-5005	This document is only applicable to ground support equipment.
Metallic Pressure Vessels, Pressurized Structures and Components	ANSI/AIAA S-80**	This document is only applicable to metallic pressure vessels, pressurized structures, special pressurized equipment, and pressure components.
Composite Overwrapped Pressure Vessels (COPVs)	ANSI/AIAA S-81	This document is only applicable to composite pressure vessels.
Vehicles, Payloads, and Other Hardware	MSFC-HDBK-505B or NASA-STD-5001	These documents are applicable to vehicles, payloads, and other hardware not listed above.

* Project specific structural assessment plans shall address additional requirements and special provisions.

** A fatigue analysis and a Leak-Before-Burst analysis are required.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-010**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/1
6. **TITLE**: Development Test Reports
7. **DESCRIPTION/USE**: To report the results of the development test activities.
8. **OPR**: JP30 9. **DM:** JP30
10. **DISTRIBUTION**: Per Contracting Officer's letter
11. **INITIAL SUBMISSION**: Per Data Requirements Matrix
12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix
13. **REMARKS**:
14. **INTERRELATIONSHIP**: DRD 1145DE-010, *Development Test Procedures*. SOW paragraphs 5.3, 6.3, 7.3 and 8.3.
15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Development Test Reports (i.e., procedure, memo, assessment, test reports, inspection reports) document the results of each development test activity.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Development Test Reports shall contain the following:

a. Conclusions and recommendations relative to success of the development test activity.
b. Description of deviations from nominal results, failures, approved corrective actions and procedures, and retest.
c. Traceability back to the requirement.
d. Copy of as-run procedure (as appropriate).
e. Identification of test configuration.
f. Specific results of each procedure including automated test segments and associated analyses.
g. Performance data, plots, and pictures (as appropriate).

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.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-011**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/1

6. **TITLE**: Development Test Procedures

7. **DESCRIPTION/USE**: To document and provide procedures for performing development test, inspection, or demonstration activities.

8. **OPR**: JP30 9. **DM:** JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: DRD 1145DE-009, *Development Test Reports*. SOW paragraphs 5.3, 6.3, 7.3 and 8.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Development Test Procedures define the detail instructions to be followed in conducting the identified development activities (test, inspection, or demonstration).

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: Each Development Test Procedure shall contain the following:

a. Identification of item/article being subjected to test, inspection, or demonstration.
b. Identification of objectives established for the particular test, inspection, or demonstration.
c. Description of steps and operations, in sequence, to be taken.
d. Identification of measuring and recording equipment to be used, specifying range, accuracy, and type and any special instructions for operating such equipment.
e. Layouts, schematics, or diagrams showing identification, location, and interconnection of item/article, support equipment, and measuring equipment.
f. Identification of hazardous situations or operations.
g. Precautions and safety instructions to ensure safety of personnel.
h. Environmental and/or other conditions to be maintained with tolerances.
i. Constraints on test, inspection, or demonstration.

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.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-012**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/1

6. **TITLE**: Thermal Analysis Report

7. **DESCRIPTION/USE**: To be used to communicate the thermal analysis that was used during design.

8. **OPR**: JP30 9. **DM:** JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraphs 6.3, 7.3 and 8.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Thermal Analysis Report provides information necessary to understand the thermal analysis that was performed during design and development.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Thermal Analysis Report shall document the thermal analysis of the component or subsystem. Critical thermal requirements shall be summarized. Analysis which shows the component parts to be within material temperature limits, supports structural analysis such as clearance studies, or defines thermal interfaces shall be documented. Each analysis description shall include thermal environments, material properties, and results.

When computer analyses, including finite element analyses are used, deliverable information shall include a description of the analyses with applicable geometry, dimensions, loads, other boundary conditions, annotated input data file(s), plots of model geometry, and results. This information shall be sufficient to recreate the analysis if necessary. Computer programs, data inputs, and data outputs utilized in these analyses must be documented and available to the Government upon request.

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.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-013**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Structural Strength and Fatigue Analysis Reports

7. **DESCRIPTION/USE**: To provide component strength and fatigue analysis and a structural analysis database used for development of the Upper Stage.

8. **OPR**: EV31/EI13/ER41 9. **DM:** JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraphs 5.3, 6.3, 7.3, 8.3 and 9.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Structural Strength and Fatigue Analysis Reports provide strength and fatigue analysis and a structural analyses database for the Upper Stage. Strength and fatigue analyses are documented to demonstrate that strength and fatigue requirements have been met. Preliminary strength and fatigue analyses shall assure the structural integrity of major structural elements and the credibility of weight calculations. Analyses provided in support of the CDR shall substantiate the structural integrity of detailed parts and provide the basis for approval of drawings. Analyses provided in support of certification shall fully substantiate the structural integrity of each detailed part in its final design configuration. Analyses provided in support of flight hardware shall be updated for the "as-built" configuration.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Structural Strength and Fatigue Analysis Reports shall document strength and fatigue analyses for Upper Stage structural flight components, and provide a structural analyses database for the flight hardware. These analyses shall verify the capability of the hardware to withstand worst case design loads. The strength and fatigue analyses reports shall identify such items as geometric description of each component, drawing or part number, identification of all applied loads, type of material and applicable strength and fatigue allowables, environments and effects, proper identification of reference inputs into the analyses, and a summary of calculated margins of safety and life predictions. An automated procedure shall be established to calculate margins for all structures and components. When loads from a new load cycle are provided, they shall be used to automatically determine new margins of safety. Effects of structural design changes shall be incorporated into this procedure so that margins of safety for the "as-built" configuration may be accurately calculated.

DRD Continuation Sheet

TITLE: Structural Strength and Fatigue Analysis Reports **DRD NO.:** **1145DE-013**
DATA TYPE: 2 **PAGE:** 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED):**
When computer analyses, including finite element analyses are used, deliverable information shall include a description of the analyses with applicable geometry, dimensions, loads, other boundary conditions, annotated input data file(s), plots of model geometry, and results. This information shall be sufficient to recreate the analysis if necessary. Computer programs, data inputs, and data outputs utilized in these analyses must be documented and available to the Government upon request.

15.4 **FORMAT**: Contractor format is acceptable. Reports shall be available in an electronic database.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete re issue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-014**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/1

6. **TITLE**: Design Definition Document

7. **DESCRIPTION/USE**: To provide support in the development and maintenance of the detailed definition of the CLV Upper Stage design and to be used as part of the overall system definition handbook materials.

8. **OPR**: ER22/JP30 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**: This DRD applies to Source Controlled Items provided by the contractor. NASA will provide the system level DDD.

14. **INTERRELATIONSHIP**: SOW paragraph 4.2

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Design Data Book prescribes the requirements for defining the CLV Upper Stage element as an integral part of the Crew Launch Vehicle.

15.2 **APPLICABLE DOCUMENTS**:

USO-CLV-SE-25707	*Upper Stage System Engineering Management Plan*
USO-CLV-DE-25108	*Upper Stage Design Definition Document*

15.3 **CONTENTS**: The Design Data Book shall include input specified in USO-CLV-SE-25707 and USO-CLV-DE-25108 including but not limited to :

a. Input to the Integrated CLV US Input/Output DAC Matrices.
b. Input to the Integrated CLV US Design Definition Document (USO-CLV-SE-25700).
c. Input to the Integrated CLV US DAC Databook (USO-CLV-SE-25701).
d. Input to the Integrated CLV US Thermal Design Databook.
e. Incorporation of Component ProEngineer Design Model into CLV US Design Master Model.
f. Input to the CLV US OML.
g. Mass Estimates.
h. Component Materials and Construction.
i. Disclosure of and substantiation for design modifications from previous DAC cycle if applicable.
j. Proposed Design Refinements for subsequent DAC cycle.
k. Driving Requirements / Assumptions / Constraints / Ground rules.
l. Evaluation and Submittal of Applicable Risks with Mitigation Plans.
m. Design Options: assessment of baselined configuration and communication of pending/ongoing design option studies.

15.4 **FORMAT**: The format of the document shall be compatible with that of the handbook defining the NDT Design Definition Document.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-015**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/1
6. **TITLE**: Development Unit Test Planning
7. **DESCRIPTION/USE**: To provide details and discussions of the identified development test activities and provide an overview approach of the overall development test program.
8. **OPR**: ER33 9. **DM:** JP30
10. **DISTRIBUTION**: Per Contracting Officer's letter
11. **INITIAL SUBMISSION**: Per Data Requirements Matrix
12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix
13. **REMARKS**:
14. **INTERRELATIONSHIP**: SOW paragraphs 6.3, 7.3 and 8.3
15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Development Unit Test Planning information provides a detail description of the development testing approach.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Development Unit Test Planning information shall include the following:

a. Detail descriptions of all development test activities (i.e., tests, analyses, inspections) to be performed based on the identified requirements. Identify any prerequisites, constraints, and objectives for all the development test activities.
b. Detail time correlated sequence of development test activities.
c. Description and planned usage of the support equipment, software, facilities, and tooling necessary to execute the development test activities.

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.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-016**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Programmable Devices Design Documentation

7. **DESCRIPTION/USE**: To define the minimum documentation and electronic configuration files needed by the customer in order to review and approve the development of programmable devices during development and to maintain and sustain the product following delivery and acceptance.

8. **OPR**: EI31 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraph 9.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Programmable Devices Design Documentation specifies deliverable documentation that discloses the physical and functional design of customized devices used in the build-up of electronics boards. Documentation of software or firmware designs loaded in PROM are not included in this requirement, although design documentation of the loading of the physical device is included, provided the loading of the device takes place prior to assembly of the programmable device to a printed circuit board.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Programmable Devices Design Documentation shall include:

a. One or more of the following will be appropriate based upon the contractor's development approach and shall be delivered:
   1. Hardware Descriptor Language design files.
   2. Schematic representations of design functionality.
   3. State machine representations.

b. Design documentation produced in support of the development of each programmable device, including requirements specifications, design description documents, interface control documents, test procedures, test reports or as-run test procedures, and design drawings.

c. Programming files, produced as the result of the design activity, used to configure the physical programmable device.

DRD Continuation Sheet

TITLE: Programmable Devices Design Documentation **DRD NO.: 1145DE-016**
DATA TYPE: 3 **PAGE**: 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED)**:

15.4 **FORMAT**: Contractor format is acceptable for documents, including schematic representations of programmable designs. Hardware Descriptor Language (HDL) designs shall be provided in an electronic ASCII-readable format.Compiled programming files, shall be provided on Compact Disc Read-Only Memory (CD-ROM) or approved equivalent. Design drawings shall be per DRD 1145CM-007.

15.6 **MAINTENANCE**: All documents produced under this DRD shall be maintained current. Changes to and/or updating of documentation shall be in accordance with the contractor's approve configuration management system for documentation and/or programmable devices.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145DE-017**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Engine Thermal Data and Analysis

7. **DESCRIPTION/USE**: To be used in future thermal analysis and to communicate the thermal analysis that was used during design.

8. **OPR**: ER43 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraphs 6.3, 7.3 and 8.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Engine Thermal Data and analysis provides information necessary to understand the thermal analysis that was performed during design and development.

15.2 **APPLICABLE DOCUMENTS**:

15.3 **CONTENTS**: The Engine Thermal Data and Analysis shall contain the following:

a. Trade Studies and Design Analysis which shall include:
   1. Sensitivities to material properties.
   2. Coolant flowrates.
   3. Pressures.
   4. Temperatures.
   5. Hardware dimensional changes.
   6. Environmental variations.
   7. Thermal design margins for major components and engine interfaces.
   8. All thermal trade studies contained in the Thermal Design Data Book.

b. Special Studies for Engine Anomalies which shall include:
   1. Failure scenarios.
   2. Possible design changes.
   3. Report on the thermal aspects of the anomalies which shall include:
      (a) References to other databases that were used.
      (b) Delivery of any models that were used.
      (c) A description of the anomaly.
      (d) Failure scenarios that were studied.
      (e) Assumptions that were used.
      (f) Results of the studies.

DRD Continuation Sheet

TITLE: Engine Thermal Data and Analysis **DRD NO.:** **1145DE-017**
DATA TYPE: 3 **PAGE:** 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED):**

c. Thermal Properties Database which shall include for all material in the engine:
   1. Thermal conductivity, specific heat, and density.
   2. Fluid properties that are used.

   NOTE: Thermophysical properties, density, thermal conductivity, specific heat, and viscosity shall be included for the temperature, pressure, and mixture ratio range that is expected in the engine. Programs used to calculate any fluid properties shall be referenced and provided to the Government.

d. Thermal Environments Database which shall include:
   1. Temperatures, pressures, flowrates, and expected heat fluxes that are used as boundary conditions for the thermal design.
   2. Transient behavior of the flow environments and heat fluxes.
   3. Environments for all engine components.

e. Geometric Math Model Database.

NOTE: The geometric math models that are used for thermal design and analysis shall be entered in a database as an aid to independent thermal analysis in the future. Geometry files entered into the database should have significant geometry information required to build a thermal model of the component.

15.4 **FORMAT**: The format shall be determined by the project.

15.5 **MAINTENANCE**: Changes shall be incorporated by change page or complete reissue.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145LS-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**: JP30

10. **DISTRIBUTION**: Cognizant property administrator

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**: This document shall be the official contract requirements document for the control and identification of all Government property.

14. **INTERRELATIONSHIP**: SOW paragraph 12.3

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.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145LS-002**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/4

6. **TITLE**: Integrated Supportability Plan

7. **DESCRIPTION/USE**: The Integrated Supportability Plan (ISP) describes how the US will be supported to meet the requirements contained in the Government provided Integrated Logistics Support Plan (ILSP) and the system requirements documents. It describes in detail how maintenance, supply, transportation, etc. will be conducted to meet the system requirements. It also documents the results of the analysis performed to support the design-for-supportability process and to determine the total resources necessary for maintenance and supportability of the system over its operational life cycle. Data generated will be used as input into other system analyses such as cost and availability modeling and predictions.

8. **OPR**: EV12 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**: Reference is made to MIL-HDBK-502, "*Acquisition Logistics*" and USO-CLV-LS-25401, *US Integrated Logistic Plan.*

14. **INTERRELATIONSHIP**: DRDs 1145CD-001, *Contract Information Technology Security Program Plan,* 1145LS-001, *Government Property Management Plan;* 1145LS-003, *Warehouse / Storage Requirements Plan* and 1145LS-004, *Construction of Facilities Quarterly Report.* SOW paragraphs 5.3, 6.3, 7.3, 8.3, 9.3 and 12.2

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE:** The Integrated Supportability Plan addresses the total support resources required for maintenance and supportability of the system over its operational life.

15.2 **APPLICABLE DOCUMENTS**:

NPD 7500.1	*Program and Project Logistics Policy*
NPD 8720.1	*Reliability and Maintainability Program Policy*
MIL-PRF-49506	*Logistics Management Information*
NPR 6000.1	*Requirements for Packaging, Handling, and Transportation for Aeronautical and Space Systems Equipment and Associated Components*
NPD 5900.1	*NASA Spare Parts Acquisition*

DRD Continuation Sheet

TITLE: Integrated Supportability Plan **DRD NO.:** **1145LS-002**
DATA TYPE: 2 **PAGE:** 2/4

15. **DATA PREPARATION INFORMATION (CONTINUED):**

15.3 **CONTENTS:** The Integrated Supportability shall contain the contractor's planning in implementing the Government's ILSP, including:

a. Supportability management and interface with other disciplines, such as reliability, maintainability, and design engineering.
b. Maintenance and support concept:
    1. Maintenance levels and maintenance sites.
    2. Maintenance functions per level.
    3. Maintenance environment (i.e., organization and resources available at each level/site).
    4. Repair/sparing policy.
    5. Maintenance item and line replaceable unit (LRU) selection criteria.
c. Facility plan.
d. Test and support equipment plan, including ground support equipment (GSE).
e. Supply support plan.
f. Packaging, Handling, Storage and Transportation (PHS&T) documentation as required by NPR 6000.1.
    1. The PHS&T Plan shall include:
        (a) Organization and responsibilities.
        (b) Requirements and process for training and certification of handling/moving personnel.
        (c) Designated points of contacts for these functions.
        (d) Process for developing the special moving/handling procedures, review, approval, and implantation for each Program Critical Hardware (PCH) item.
        (e) Method to ensure that all support and handling/moving equipment meets current safety and industry certification.
    2. List of items designated as PCH and the locations where these items are to be moved/handled.
    3. Detailed procedures required for each item designated as PCH for each handling and moving operation.
    4. Designation of responsible organizations for handling each PCH item, its approximate weight, methods for handling, and any handling or moving constraints.
    5. Safety and preventive maintenance instructions for each PCH item.
    6. Details of periodic storage inspection processes required to insure that the stored articles meet the requirements for storage as outlined in the procedures.
g. Provisioning plans.
h. Manpower and personnel (Maintenance and Logistics).
i. Maintenance training and training support.
j. Standardization/commonality policy.
k. Technical data/database documentation criteria and management.
l. Contingency plan.
m. Obsolescence plan.
n. Post-production support, including anticipated support difficulties, continuous improvement, and sustaining engineering.
o. Disposal plan (i.e., hazardous items and end of life cycle).

DRD Continuation Sheet

TITLE: Integrated Supportability Plan **DRD NO.:** **1145LS-002**
DATA TYPE: 2 **PAGE:** 3/4

15. **DATA PREPARATION INFORMATION (CONTINUED):**

The ISP shall document the results of the analyses performed in the Ares-I Project Logistics Support Analysis database with information according to NPD 7500.1, NPD 8720.1, and MIL-PRF-49506 under the following categories:

a. Reliability Centered Maintenance Analysis.
b. Repair Level Analysis.
c. Maintenance Task Analysis.
d. Recommended Spare Parts List shall specify the following for each item listed as defined in NPD 5900.1:
    1. Provisioning Line Item Sequence Number.
    2. True Manufacturing Part Number and nomenclature.
    3. Part number and nomenclature of the next higher assembly.
    4. UOI (Unit of Issue).
    5. CAGE Code/FSCM.
    6. SMR Code.
    7. Lead time.
    8. Shelf-life.
    9. Quantity per assembly.
    10. Unit pack.
    11. Special handling code.
    12. Recommended quantity.
    13. Approved quantity.
    14. Total quantity supported.
    15. Unit cost.
    16. Government Furnished Property (GFP).
    17. Recommended Spares Acquisition Integrated with Production (SAIP) opportunities to include life of type spares and repair parts buys.
e. Test and Support Equipment Requirements, including ground support equipment (GSE).
    1. Concise description of each end item.
    2. Short description of the general requirements to be met (i.e., purpose, function, unique requirements, usage location, if known, and safety category).
    3. Identification of those end items that are common for use with other systems.
    4. Indicate availability by one of the following categories:
        (a) Government Furnished Equipment (GFE).
        (b) Modify GFE.
        (c) Commercial.
        (d) Modify commercial.
        (e) Manufacture (new).
f. Facility Requirements.
g. Manpower, personnel and training requirements.
h. Provisioning and Supply Support Analysis.
i. Standardization / Commonality Analysis.

DRD Continuation Sheet

TITLE: Integrated Supportability Plan **DRD NO.:** 1145LS-002
DATA TYPE: 2 **PAGE:** 4/4

15. **DATA PREPARATION INFORMATION (CONTINUED):**
    j. Packaging, Handling, Storage and Transportation (PHS&T) requirements.
    k. Technical data, documentation and database requirements.
    l. Post-Production Support.
    m. Supportability Life Cycle Cost Analysis.

In addition to the above database information, the contractor shall also deliver source data including but not limited to parts information and task procedures.

15.4 **FORMAT**: The Data Products shall be in accordance with the associated format in Appendix B of MIL-PRF-49506.

15.5 **MAINTENANCE:** Changes shall be incorporated by complete reissue or update of individual and associated analyses.

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145LS-003**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/1

6. **TITLE**: Warehouse/Storage Requirements Plan

7. **DESCRIPTION/USE**: To provide data for planning, management, and control of warehouse facilities.

8. **OPR**: AS40 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraph 12.3

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Warehouse/Storage Requirements Plan provides current detailed warehousing plans and location schemes.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Warehouse/Storage Requirements Plan shall contain the following:

a. Warehouse space layout and proposed usage measured in square feet for supplies and materials, program stock, custodial storage, and other stock/storage uses.
b. Narrative of identified issues, specialized storage requirements, future requirements, and recommended solutions. NOTE: All requirements shall be identified in square feet measurements.
c. Other data as requested by the COTR.

15.4 **FORMAT**: Contractor format is acceptable with MSFC approval.

15.5 **MAINTENANCE**: None required

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145LS-004**
3. **DATA TYPE**: 2
4. **DATE REVISED**:
5. **PAGE**: 1/1

6. **TITLE**: Construction of Facilities (CoF) Quarterly Report

7. **DESCRIPTION/USE**: To provide data for planning, management, and control of the facilities required for support of the Crew Launch Vehicle Upper Stage.

8. **OPR**: AS41 9. **DM**: JP30

10. **DISTRIBUTION**: Per Contracting Officer's letter

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**:

14. **INTERRELATIONSHIP**: SOW paragraph 12.1

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Construction of Facilities (CoF) Quarterly Report provides planning and justification to support the MSFC, Constellation Program, and Agency facility needs.

15.2 **APPLICABLE DOCUMENTS**: None

15.3 **CONTENTS**: The Construction of Facilities (CoF) Quarterly Report shall be documented on the attached Construction of Facilities Request Form.

15.4 **FORMAT**: Contractor format is acceptable with MSFC approval.

15.5 **MAINTENANCE**: None required

Construction of Facilities Request Form

Institutional and Program Direct Projects

Date: Project Title: **CLV/Upper Stage Element**

Requesting Organization:

Requesting Office Manager Concurrence:

Management Point of Contact/Phone:

Element Point of Contact/Phone: *(Individual to coordinate/develop requirements with Facilities Planning)*

Funding Advocate Organization(s)/Contact(s)/phone:

Funding Advocate Concurrence signature:

I. Project Requirement Statement: *(Brief summary statement describing what is needed and where it is needed – Include any cost estimates developed)*

II. Fiscal Year Project is needed *(indicate when the project must be completed to meet the requirement):*

A. What milestone dictates the need for this capability in the requested year?

B. What is the impact of delay?

III. Project Requirements Definition and Justification: *(as applicable)*

A. Which program sponsors this project and who is the Headquarters Advocate? Which is Lead Center?

B. Who are the primary users/benefactors?

C. What link does this have to Strategic Implementation Plans, business goals, core competency assessment, MSFC Master Plan?

D. Were there other avenues (alternatives/options considered) explored to meet this requirement? What is the disposition of these alternatives?

E. What other facility or resources are being used to meet these requirements?

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**: 1145 **ISSUE**: RFP
2. **DRD NO.**: **1145LS-005**
3. **DATA TYPE**: 3
4. **DATE REVISED**:
5. **PAGE**: 1/2

6. **TITLE**: Annual and Monthly Financial Reporting of NASA Property in the Custody of Contractors

7. **DESCRIPTION/USE**: To report NASA property in the custody of contractors on an annual and monthly basis.

8. **OPR**: AS41/RS22 9. **DM**: JP30

10. **DISTRIBUTION**: NASA Form (NF) 1018, NASA Property in the Custody of Contractors, reports shall be submitted using the NF 1018 Electronic Submission System (NESS)* (https://ness.gsfc.nasa.gov) in accordance with the NASA FAR Supplement (NFS) 1852.245-73 clause in the contract. Monthly reports shall be electronically submitted using the Contractor-Held Asset Tracking System (CHATS) (https://nasa.hats.gsfc.nasa.gov) in accordance with Procurement Information Circular (PIC) 04-12 dated June 9, 2005, incorporated via modification to the contract for contracts that have total NASA Property in excess of $10 million.

11. **INITIAL SUBMISSION**: Per Data Requirements Matrix

12. **SUBMISSION FREQUENCY**: Per Data Requirements Matrix

13. **REMARKS**: *Access to the NESS may be obtained by completing an Access Request Form which is available at: https://ness.gsfc.nasa.gov/login/index.cfm. NOTE: Notify the Center's Industrial Property Officer (IPO) for additional assistance once access has been granted.

14. **INTERRELATIONSHIP**: SOW paragraph 3.2.1

15. **DATA PREPARATION INFORMATION**:

15.1 **SCOPE**: The Annual and Monthly Financial Reporting of NASA Property in the Custody of Contractors fulfills the requirements of NASA FAR Supplement clause 1852.245-73, which requires summary-level property management and financial data on Government Furnished Property (GFP) or Contractor Acquired Property (CAP) that are NASA assets in the custody of Contractors. The monthly report fulfills the requirements of PIC 04-12, for contracts that have NASA property in excess of $10 million as of June 30, 2004. Monthly reports are required with item level supporting data for all items with an acquisition cost of $100,000 or more in the contractor's and its subcontractor's possession, in the following classifications: real property, equipment, special test equipment, special tooling, agency peculiar property, material and work-in-process (WIP).

15.2 **APPLICABLE DOCUMENTS**:

NFS Subpart 1845.7101	*Instructions for preparing NASA Form 1018*
Procurement Information Circular (PIC) 04-12	*Contract Modifications for Monthly Property Financial* Reporting
NFS Subpart 1852.245-73	*Financial Reporting of NASA Property in the Custody of Contractors*

DRD Continuation Sheet

TITLE: Annual and Monthly Financial Reporting of NASA Property in the Custody of Contractors **DRD NO.:** **1145LS-005**

DATA TYPE: 3 **PAGE:** 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED):**

15.3 **CONTENTS**:

a. Per NFS Subpart 1845.7101, Financial Reporting of NASA Property in the Custody of Contractors Report shall meet the following requirements:

1. Annual reports shall be prepared in accordance with the instructions on the form and NFS subpart 1845.7101 and any supplemental instructions for the current reporting period issued by NASA.
2. NASA Form (NF) 1018 reports shall be submitted using the NF1018 Electronic Submission System (NESS)* (https://ness.gsfc.nasa.gov). If the NESS system is not utilized, annual reports shall be prepared using the NF 1018 provided at: https://ness.gsfc.nasa.gov/login/index.cfm and faxed to the Center Industrial Property Officer for input to the NESS. The information contained in these reports is entered into the NASA accounting system to reflect current asset values for agency financial statement purposes.
3. Contractors shall have formal policies and procedures, which address the validation of the NF 1018 data, including data from subcontractors, and the identification and timely reporting of errors. The objective of this validation is to ensure that information reported is accurate and in compliance with the NASA FAR Supplement.

b. Per PIC 04-12, monthly reporting shall meet the following requirements:

1. All quarterly property financial reporting requirement is changed to monthly reporting, with additional data elements, for contracts with $10 million or more in NASA property.
2. Monthly reports shall be electronically submitted using the Contractor-Held Asset Tracking System (CHATS) (https://nasachats.gsfc.nasa.gov). If CHATS is unavailable the report shall be submitted electronically via email to: nasacontractorproperty@nasa.gov.
3. Acquisition costs shall be developed using actual costs to the greatest extent possible, especially costs directly related to fabrication such as labor and materials. Supporting documentation shall be maintained and available for all amounts reported, including any amounts developed using estimating techniques.
4. All adjustments shall be thoroughly explained and directly related to a specific fiscal year. If the fiscal year cannot be determined, the default shall be the previous fiscal year.
5. Work Breakdown Structures (WBS) shall be provided for all CAP, WIP, and any new materials acquired. The format shall be a five digit numerical level, (i.e. 803-10). If the WBS is not identifiable, contact the NASA Chief Financial Officer (CFO) Property Branch for further guidance.

15.4 **FORMAT**: Annual reports shall be provided using NASA Form 1018 (current revision) and shall be submitted electronically via NESS. Monthly reports shall be submitted using the format described in the CHATS user's manual or the CHATS electronic version from NASA Headquarters.

15.5 **MAINTENANCE**: None required