CONTRACT DELIVERABLES REQUIREMENTS LIST (CDRL)

FOR THE GLAST PROJECT

LARGE AREA TELESCOPE INSTRUMENT

October 2000

GODDARD SPACE FLIGHT CENTER NATIONAL AERONAUTICS AND SPACE ADMINISTRATION GREENBELT, MARYLAND REV

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Part A. INTRODUCTION, DEFINITIONS, AND DISTRIBUTION INSTRUCTIONS

1.0 INTRODUCTION

This document defines the requirements for deliverables to be provided by the GLAST LAT Contractor (Stanford University). Part A includes the introduction, definitions, and instructions for mailing and/or distribution. Part B presents the CDRL item by item, with due dates, quantity, and a distribution key. Part C provides a description of each item and describes use, and preparation information. Except where specifically indicated to the contrary, the formats and drawing standards used shall be those normally used by the GLAST LAT Contractor and/or by its subcontractors. This document describes only those deliverables which are required during the formulation phase of the project, which is the extent of the current contract.

This document includes that subset of CDRLs that pertains to areas discussed in the following GLAST documents:

- (a) Statement of Work for the GLAST LAT.
- (b) Mission Assurance Requirements (MAR) for the GLAST LAT.

2.0 <u>DEFINITION OF DUE DATES/MATURITY</u>

The following definitions apply to the "DUE DATE, MATURITY" column in Part B:

- (a) DUE DATE
 - <u>Proposal</u>: Items that are provided with the proposal and subject to negotiation prior to contract go-ahead.
 - <u>PDR, CDR, etc.</u>: Preliminary Design Review, Critical Design Review, etc. Documentation received 10 working days prior to review, unless otherwise stated.
 - <u>As Generated</u>: After each initial edition, revision, addition, etc. Items that are critical to schedule, performance, or interface shall be transmitted to GSFC by facsimile, express mail, or electronically within 3 working days of generation.
 - <u>Quarterly</u>: with quarterly status reports
 - Monthly: at a certain time every month
 - <u>Weekly</u>: with weekly status reports
 - <u>T</u>: Launch Date
 - <u>DACM</u>: X days after contract modification (i.e., basic contract definitization)
- (b) MATURITY
 - <u>Preliminary</u>: The initial submission of an item. To be completed as is practicable at the time of preparation.
 - <u>Final</u>: The complete thorough submission of an item for approval or information; if submitted with proposal it is subject to contract negotiation. This does not preclude updating at a later date. Any updates shall require the same "approval" process as was required for the previous submissions.
 - <u>Current</u>: The best up-to-date information available at the time.

Other entries in the "DUE DATE, MATURITY" column are self explanatory.

3.0 MAILING AND/OR DISTRIBUTION

The following definitions apply to the "Quantity (QTY)" column in Part B:

- "E": submission is preferrably by electronic means
- Number: submission of hardcopies of the specified number; distributed according to DIST code described below, with extra copies to the TO, or Review Team, if required.

The following definitions apply to the "Distribution (DIST)" column in Part B:

• "A": Copies to the contracting officer, technical officer, configuration management office, GLAST Project Office, and the GLAST Library

• "B": Copies to the contracting officer, technical officer, and the GLAST Library

• "C": Copies to the contracting officer, technical officer, and resource analyst

• "D": Copies to the technical officer only

Note: Copies of all Series 3XX documents will also be distributed to the GLAST Systems Assurance Manager.

4.0 <u>DEFINITION OF CATEGORIES</u>

The following definitions apply to "Submission Category (CAT)" column in Part B:

- <u>A:</u> Approval -- Documents in this category require written GSFC approval prior to use. Requirements for resubmission shall be as specified in letter(s) of disapproval.
- <u>I:</u> Information -- Documents in this category require receipt by GSFC for the purpose of determining current program status, progress, and future planning requirements. When Government evaluations reveal inadequacies, the contractor will be directed to correct the documents.

Part B. GLAST DOCUMENTATION LISTING

Note that the following notes apply to CDRL series 0XX through 2XX. The Safety and Mission Assurance CDRLs (3XX series) have a slightly different format, where the information is contained on each data item description page and on the summary chart for the 3XX deliverables).

0.0 PLANS AND REPORTS(0XX SERIES)

SUB NO.	DOCUMENT	DUE DATE, MATURITY	QTY	DIST	CAT
001	Management Plan	With Proposal 90 DACM, Final	E	A	I A
002	Configuration Management Plan Update	With Proposal 60 DACM, Final	Е	A	I A
003	GLAST LAT Software Management Plan	90 DACM, Prelim SWPDR, Final	E E	A A	I A
004	Small Business and Small Disadvantaged Business Concerns Subcontracting Reports	Quarterly, Final	E	A	A
005	GLAST LAT Calibration Plan	PDR, Final	Е	А	A
006	Configuration Change Requests (CCR) Class I	As Generated, Final	Е	A	A
007	Weekly Status Reports	Weekly, Current	Ε	В	I
008	Quarterly Status Reports	Quarterly, Final	Ε	А	I
009	Monthly and Quarterly Financial Management Report (NASA Form 533M/5330)	Monthly and Quarterly, Final	Е	С	I

010	End of Phase A/B Report and Presentation	End of Phase A/B	15	A	Ι
011	Subsystem Peer Review Reports	As Generated, Final	Eor5	А	I
012	Suborbital Flight Test Report	120 days after flight	Е	А	Ι

1.0 MATH MODELS AND ANALYSES (1XX SERIES)

SUB NO.	DOCUMENT	DUE DATE, MATURITY	QTY	DIST	CAT
101	GLAST LAT Structural Math Model	PDR, Preliminary	E	D	I
102	GLAST LAT Thermal Math Model	PDR, Preliminary	Е	D	I

2.0 MISCELLANEOUS (2XX SERIES)

SUB NO.	DOCUMENT	DUE DATE, MATURITY	QTY	DIST	CAT
201	Education and Public Outreach Material	As Generated	N/A	N/A	N/A
202	Signed Agreements with Non-U.S. Partners	PDR, Final	E	A	I

Part C. DATA ITEM DESCRIPTIONS

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
MANAGEMENT PLAN	001

3. <u>Use:</u>

Describes how the project is organized and managed. Describes what work is to be performed and where it will be performed. It provides the management structure, its system of operation, responsible lines of communications, and key personnel assignments.

4. Preparation Information:

PROJECT MANAGEMENT

This plan shall address the overall organization, management approach, and structure of the GLAST LAT Project.

Describe how and where the program will operate during all phases of the contract. Delineate how the requirements of the Statement of Work (SOW) will be achieved and include, as a minimum, a description of planned activities for identifiable SOW requirements.

Describe the work to be performed, and what organization will be performing it. Also describe the interorganizational agreements required, and plans for implementing them.

Describe your concept of the nature of the tasks and related potential problems. Discuss your approach to problem avoidance and/or solution. Address the degree to which your proposed personnel and procedures are proven through similar experience.

This plan shall address interfaces with the Government. Indicate such things as critical paths, long-lead items and significant milestones.

This plan may include graphical displays such as flow diagrams, WBS, logic networks, etc., to reduce verbal descriptive material.

CDRL NO. 001 (CONTINUED)

This plan shall provide an organizational chart(s) and sufficient supplemental narrative to describe fully the following:

- a. Organization proposed for carrying out the project showing inter- relationships of technical management, business management, and subcontract management, from lower level through intermediate management to top-level management with detailed explanation of:
 - The authority of the GLAST LAT Project Manager relative to other ongoing programs and applicable support organizations within the company structure. Discuss the project manager's control over essential resources and functions necessary to accomplish the work.
 - How and by whom interdepartmental work will be monitored and the authority of the project manager over interdepartmental work.
 - Process to be followed by the project manager in obtaining decisions beyond his/her authority and in resolving priority conflicts for resources and functions not under the project manager's direct control such as personnel, finances, and facilities.
- b. Contractual procedures proposed for the project to effect administrative and engineering changes, describing any differences from existing procedures.

This plan shall describe management techniques to be employed in minimizing project costs and schedule impacts, including controls to be exercised over subcontractors and suppliers. Describe how issues will be surfaced in a timely manner and at the proper levels.

This plan shall discuss and illustrate the proposed GLAST LAT Performance Assurance organizational structure, including staffing plans, reporting channels, authority and responsibilities, and management visibility. State the number and kind of persons who would have to be hired, and plans to obtain them.

 1. <u>Title:</u>
 2. <u>CDRL No.:</u>

 CONFIGURATION MANAGEMENT PLAN
 002

3. <u>Use:</u>

Defines a configuration management system which provides a means of control for all changes affecting form, fit, or function and any impact on performance, cost, or schedule.

4. Preparation Information:

The contractor's Configuration Management Plan shall describe the scope, approach, methods, and procedures of the system that he will use to implement the configuration management requirements. The plan shall at least be written to conform to the GLAST Project Configuration Management Plan.

1. Title:2. CDRL No.:GLAST LAT SOFTWARE MANAGEMENT PLAN003

3. <u>Use:</u>

Provides overview and control for a disciplined approach to the instrument software management.

6. Preparation Information:

This shall apply to all of the software provided by the GLAST LAT developer for the GLAST Project, including onboard software used to conduct system testing. Software that is institutional and multiuser, or part of a "generic" capability, shall be identified as to its use on the Project, where it is documented, and how it is managed. It is not controlled by this plan. However, all mission "peculiar" or mission "unique" changes to a basic capability shall fall within the scope of this plan.

1. <u>Title:</u>

2. CDRL No.:

SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS SUBCONTRACTING REPORTS 004

3. <u>Use:</u>

Provide status of meeting small and small disadvantaged business subcontracting goals.

4. Preparation Information:

Prepare in accordance with FAR Clause 52.219-9. Show status of all relevant contracts, with justification for the amount towards small/small disadvantaged organizations.

Submit in accordance with Part B of this document.

1. <u>Title:</u>

2. CDRL No.:

005

GLAST LAT CALIBRATION PLAN

3. <u>Use:</u>

Controlling document for definition of calibration requirements, equipment and methods.

4. Preparation Information:

This document shall include the rationale for all calibration plans. It shall specify the requirements for calibration of the LAT instrument for each subassembly phase. The prelaunch calibration activities shall be discussed in terms of meeting the science requirements, verification of those requirements, and schedule of all calibration activities. Requirements for calibration equipment and workforce shall be stated. Calibration activities required after integration with the spacecraft, including the required environment for those activities, shall be specified, and needed equipment shall be stated. Post-launch calibration activities shall also be stated in a separate section of the document. This shall include any constraints required on the operation of the spacecraft.

 1. <u>Title:</u>
 2. <u>CDRL No.:</u>

 CONFIGURATION CHANGE REQUESTS (CCR)
 006

 CLASS I
 006

3. <u>Use:</u>

Class I changes are to be used as a vehicle for orderly processing of change requests to appropriate level of approval authority for disposition. Class II changes are to be used as a vehicle for processing of all change requests not classified as Class I to appropriate levels for concurrence.

4. Preparation Information:

The developer shall prepare Class I Change Requests for all changes that may impact form, fit, function, cost, schedules or performance. These changes shall be processed according to the procedures outlined in the GLAST Configuration Management Plan and shall be reviewed and approved by appropriate levels of the Configuration Control Board.

1. <u>Title:</u>	2. <u>CDRL No.:</u>
WEEKLY STATUS REPORTS	007

3. <u>Use:</u>

Development status evaluation.

4. Preparation Information:

On one day of each week chosen by the developer, the developer shall email to the Technical Officer a written report indicating the status of the development as of close of business the preceding day, including a summary of progress made. This report shall include, but not necessarily be limited to the following for the week prior to the report: technical progress, including significant accomplishments and milestones reached; problems or issues encountered with proposed corrective actions, if known; and any actual or anticipated slip in schedule.

Note: This weekly report is intended to be timely and informal and should detail the above topics as changes or problems occur.

1. <u>Title:</u>

2. CDRL No.:

QUARTERLY STATUS REPORTS

008

3. <u>Use:</u>

Quarterly Status Report data shall be used by GSFC system managers to: (1) evaluate contract performance, (2) identify the magnitude and impact of actual and potential project areas causing significant cost, schedule or technical variances, and (3) provide valid, timely project status information to higher authorities.

4. Preparation Information:

The developer shall submit a quarterly status report 15 days after the end of each quarterly reporting period. It shall be submitted by email to the technical officer and the contracting officer. The report shall include system and subsystem status information. It shall include, but not necessarily be limited to: progress since the last quarterly report, including accomplishments vs. plans for the quarter; plans for work for the next quarter; technical and programmatic issues, including any effects on schedule, cost, technical design, or requirements for technical resources (mass, power, volume, data rate), and including mitigation or resolution plans. It shall include technical, programmatic, system assurance and safety, software, and education and public outreach status. It shall also include the current schedule, highlighting the critical path.

1. Title:2. CDRL No.:MONTHLY AND QUARTERLY FINANCIAL
MANAGEMENT REPORT (NASA FORM 533M/533Q)009

3. <u>Use:</u>

To document, evaluate, and project cost performance in support of the NASA accrued revenue and expenditure accounting system.

4. Preparation Information:

The monthly 533M and quarterly 533Q shall be submitted providing the information required on the forms. If 533 forms are not familiar to the developer, other forms may be used, provided they supply the same information.

1. <u>Title:</u>	2. <u>CDRL No.:</u>
End of Phase A/B Report and Presentation	010

3. <u>Use:</u>

To document work accomplished and technical and programmatic characteristics of the LAT instrument.

4. Preparation Information:

The presentation may be combined with required review presentations, such as the PDR and the NAR, provided both technical and programmatic (including cost and schedule) aspects of the project are covered. The report shall address only the technical status of the instrument development, giving a complete description of the instrument, and the trade studies currently in process or planned.

1. <u>Title:</u>	2. <u>CDRL No.:</u>
Subsystem Peer Review Reports	011

3. <u>Use:</u>

To keep the Project informed of designs and design issues.

4. Preparation Information:

Whatever materials are generated for LAT subsystem internal peer reviews, should be submitted. There is no specific format or requirement, other than what the developer decides to provide at the review.

1. <u>Title:</u>	2. <u>CDRL No.:</u>
Suborbital Flight Test Report	012

3. <u>Use:</u>

To document the results and resulting plans from the suborbital test flight.

4. Preparation Information:

This report shall include description of the goals and requirements of the suborbital test flight, as compared with the actual results. It shall also document how the results will be used in the further optimization of the design of the instrument and its software.

1. Title:2. CDRL No.:GLAST LAT STRUCTURAL MATH MODEL101

3. <u>Use:</u>

For providing instrument interface information to be utilized in various statics and dynamics observatory analyses.

4. Preparation Information:

The deliverable GLAST LAT Structural Math Model shall meet all requirements listed in the GLAST IRD. In addition to these requirements, the math model shall be compared with a modal survey carried out on the structural/thermal model to verify frequency and mode shape predictions of the structural math model. The frequency predictions shall agree with the modal survey results to within 5 percent for the first mode and 10 percent for all other significant modes up to 100 Hz. In addition to the frequency correlation, the mode shape correlations between test and the analytical model shall include a cross-orthogonality check, a mode shape geometric similarity check, and a static deflection check. The final update of the structural model shall include any modifications required to correlate the model to the physical test results. [Note that only the preliminary model is deliverable during the timeframe of this contract.]

1. Title:2. CDRL No.:GLAST THERMAL MATH MODEL102

3. <u>Use:</u>

To evaluate the thermal performance of the instrument.

4. Preparation Information:

The GLAST Sinda thermal model shall be composed of a sufficient number of nodes (> 250 nodes) to simulate key instrument heat flows, temperatures, and interface temperatures. Design cold and hot case thermal models and model results shall be provided. A transient Sinda model shall also be provided that simulates the anticipated worst transient case in terms of maximum orbital temperature fluctuation.

The geometry model used to calculate view factors and orbital absorbed heat loads shall also be included. The geometry model will be in TSS or TRASYS compatible format. Both the input and output data associated with a selected case shall be provided.

A users guide shall be provided for deliverable math models that describes thermal model nodal representation, key assumptions, and case descriptions.

1. <u>Title:</u>	2. <u>CDRL No.:</u>
Education and Public Outreach Materials	201

3. <u>Use:</u>

To provide educational materials to areas of the community for disseminating the information learned by activities associated with this contract.

4. Preparation Information:

These materials shall be developed and disseminated in accordance with the activities specified in the LAT proposal.

1. <u>Title:</u>	2. <u>CDRL No.:</u>
Agreements with Non-U.S. Partners	202

3. <u>Use:</u>

To document the international arrangements of responsibility and participation.

4. Preparation Information:

Whatever agreements are put in place, at the developers choice, and consistent with the Implementing Arrangement between NASA and DOE for the GLAST Project, shall be signed by both parties. At a minimum, it shall include the division of responsibilities of each participation country.

CDRL NO.	DESCRIPTION	Due Date, Maturity	Qt y	Dist	Cat
301	Performance Assurance Implementation Plan (PAIP)	90 DACM, Final As Generated, Revisions	E	А	А
302	System Safety Program Plan (May incorporate into PAIP)	90 DACM, Final As Generated, Revisions	E	А	А
303	Preliminary Hazard Analysis (PHA)	PDR, Preliminary	Е	В	А
304	Hazard Control Verification	PDR, Preliminary As Generated or Updated	E	В	А
305	Safety Noncompliance Reports	As Generated, Final	Е	В	А
		GSFC Chaired/Co-Chaired Review Technical Material - 7 work days prior to review, final			I
306	Technical Reviews	Minutes & Action Items for Technical Review - 10 work days following review, final	E	В	I
		Responses to Government Action Items or Requests for Information/Action - Per Schedule Established at/for Review, Final			А
307	Instrument Performance Verification Plan	20 Work Days Prior to PDR, Preliminary	E	А	
308	Parts Control Plan (PCP) (May incorporate into PAIP)	90 DACM, Final As Generated, Revisions	E	А	А
309	Parts Control Board (PCB) Reports	5 Work Days After PCB Meeting, Final	Ε	В	I
310	Parts Identification List (PIL) (and As Built Parts List [ABPL])	90 DACM, Final As Generated, Revisions 30 Work Days Prior to PDR, Current	E	A	A
311	Alert/Advisory Disposition and Preparation	Responses - 25 Calendar Days After Receipt of Alert/Advisory from GSFC, Final Preparation - Within 60 Days of Problem's Discovery	E	В	I
312	Materials, Processes and Lubrication Assurance Plan (May incorporate into PAIP)	90 DACM, Final As Generated, Revisions	E	А	А
313	Materials Usage Agreement	30 Days Prior to PDR, Preliminary	Е	Α	А
314	Polymeric Materials and Composites Usage List	30 Days Prior to PDR, Preliminary	Е	А	I
315	Inorganic Materials and Composites Usage List	30 Days Prior to PDR, Preliminary	Е	А	- 1
316	Lubrication Usage List	30 Days Prior to PDR, Preliminary	Е	Α	I.

Safety and Mission Assurance Documentation (3XX SERIES)

317	Material Process Utilization List	List - 30 Days Prior to PDR, Preliminary Copy of Process - Upon Request, Final	E	A B	I
CDRL NO.	DESCRIPTION	Due Date, Maturity	Qt y	Dist	Cat
318	Failure Mode and Effects Analysis (FMEA) and Critical Items List (CIL)	30 Days Prior to PDR, Preliminary	E	Α	
319	Limited Life Items	30 Days Prior to PDR, Preliminary	Е	Α	I
320	Quality Manual	90 DACM, Final As Generated, Revisions	Е	В	Ι
		Within 24 Hours of Occurrence, Preliminary		В	I
321	Nonconformance Reports (NCR's)	At Completion of Analysis & Assignment of Corrective Action, Current	Е	В	I
		Within 3 Work Days of Closure, Final		А	A
322	Contamination Control Plan	30 Days Prior to PDR, Preliminary	Е	А	Ι
212	Electronic Conject of Dequirements Decuments	At Time of Draft Release for Review, Preliminary	Е	р	
323	At Time of Major Revision Release for Review, Current		Ē	D	
224	Dick Management Dian (May incorporate into DAID)	90 DACM, Final	с	^	٨
324	Risk Management Flan (May Incorporate linto FAIF)	Revisions, As Generated	L	A	~
325	Information Needed to Prepare Probabilistic Risk Analysis (PRA)	As required by the Government Prior to PDR, Final	Е	В	Ι
326	Information Needed to Prepare Fault Tree Analysis (FTA)	As required by the Government Prior to PDR, Final	Е	В	Ι
327	Information Needed to Prepare Risk Assessment	As required by the Government 30 Days After A Request, Final	E	В	I

Performance assurance implementation plan

Title:	CDRL No.:		
Performance Assurance Implementation Plan	301		
Reference:			
MAR Section 1.1			
Use:			
Detail the developer's system safety and mission assurance program for their GLAST instru	ment.		
Related Documents			
None			
Place/time/purpose of delivery:			
Delivery is due to GSFC 90 days after contract signing for approval. Any subsequent revisions to PAIP must be submitted to GSFC for approval.			
Preparation Information:			
The Performance Assurance Implementation Plan will include the details of the developer's plans	for implementing the following program:		
 a) System Safety (May be a separate document.) b) Technical Review c) Design Validation d) Electronic Packaging and Processes e) Parts (May be a separate document.) f) Materials, Processes, and Lubrication (May be a separate document.) g) Reliability h) Quality Assurance i) Contamination Control j) Software Assurance k) Ground Data Systems Assurance l) Risk Management 			

SYSTEM Safety PROGRAM plan

Title:	CDRL No.:	
System Safety Program Plan	302	
Reference:		
MAR Section 2.1		
Use:		
This plan describes in detail the tasks and activities of system safety management and engineering required to identify, evaluate, and eliminate and control hazards, or reduce the associated risk to a level acceptable to Range Safety throughout the system life cycle. The approved plan shall account for all contractually required tasks and responsibilities on an item-by-item basis.		
Related Documents: EWR 127-1		
Place/Time/Purpose of Delivery:		
Deliver to GSFC with, or as part of, the Performance Assurance Implementation Plan for approval. Any subsequent revisions must be approved by GSFC.		

Preparation Information:

Refer to Appendix 1B of EWR 127-1 for preparation directions.

preliminary hazard analysis (pha)

Title:	CDRL No.:		
Preliminary Hazard Analysis (PHA)	303		
Reference:			
MAR Section 2.1			
Use:			
Used to identify safety critical areas, provide an initial assessment of hazards, and identify requisite hazard controls and follow-on actions. The analysis will result in an initial risk assessment of the system.			
Related Documents:			
EWR 127-1			
Place/Time/Purpose of Delivery:			
The first delivery will be at the PDR for GSFC approval. (Note: An update will be due at CDR for GSFC approval.)			

Preparation Information:

Refer to Appendix 1B of EWR 127-1 for guidance on the performance of a PHA.

hazard control verification LOG

Title:	CDRL No.:		
Hazard Control Verification Log	304		
Reference:			
MAR Section 2.1			
Use:			
Used to document the instrument safety assessment such that it reflects how the instrument design demonstrates compliance with the safety requirements.			
Related Documents:			
EWR 127-1			
Place/Time/Purpose of Delivery:			
Initially generated to document results of hazard analyses and updated as analysis results warrant. It will be made available to Range Safety upon request. The first delivery is due at the PDR for approval. All revisions require GSFC approval.			

Preparation Information:

Refer to Appendix 1B.1 of EWR 127-1 for preparation directions.

Safety Noncompliance Reports

Title:	CDRL No.:
Safety Noncompliance Reports	305
Deference:	
MAR Section 2.1	
Use:	
Used to document the inability to meet program requirements, or the ability to meet requirements.	equivalent though not exact, program
Related Documents:	
EWR 127-1	
Place/Time/Purpose of Delivery:	
As required for GSFC approval.	

Preparation Information:

Refer to Appendix 1C of EWR 127-1 for preparation directions.

Technical reviews

Title:	CDRL No.:		
Technical Reviews	306		
Defense			
Reference:			
MAR Section 3			
Use:			
Provide review material and hand-outs for technical reviews which review team members will need to read prior to the review. Provide review minutes and action items after technical reviews.			
Related Documents:			
None			
Place/Time/Purpose of Delivery:			
Provide review materials/hand-outs 7 work days prior to each GSFC- chaired/co-chaired technical review for information. This will include the SRR, instrument PDR (including software PDR), support for Mission PDR, and support for Non-advocate Review. Provide minutes and action items from each technical review (peer or GSFC-chaired/co-chaired) within 10 work days following each review for GSFC review. Provide responses to Government action items/requests for information (per the schedule established at/for the review) for GSFC approval.			

Preparation Information:

Prior to each GSFC-chaired/co-chaired technical review, provide an electronic or hard copy of technical review material including vu-graphs. Documentation may be made available via a website. Material shall include risk and safety status as of the date of the particular technical review.

Following each peer review, provide meeting minutes and action items. Material may be provided via hard copy, electronic copy, or website.

Following each GSFC-chaired/co-chaired technical review, provide meeting minutes, as needed or as agreed upon with the GLAST Project Office, to supplement/complement the GSFC chair's/co-chair's minutes. This may include splinter meeting minutes. Additionally, after each GSFC-chaired/co-chaired technical review, provide any pertinent action items authored by the developer and/or their collaborators during the meeting or as a result of the meeting.

Provide responses to Government actions items/requests for information/action via the format requested at each review: electronic, hard copy or web-based.

INSTRUMENT Performance VERIFICATION Plan

Title: Instrument Performance Verification Plan	CDRL No.: 307		
Reference:			
MAR Section 4.2.1			
Use:			
Provides the overall approach for accomplishing the verification program. Defines the s alignments, etc. that will demonstrate that the hardware complies with the mission requi	pecific tests, analyses, calibrations, rements.		
Related Documents			
None			
Place/Time/Purpose of Delivery:			
Provide a preliminary draft 20 work days prior to the PDR for GSFC review. (Note: The final draft will be due at CDR for GSFC approval. Updates will be provided as required for GSFC approval.)			
Preparation Information:			
Describes the approach (test, analysis, etc.) that will be utilized to verify that the requirements. If verification relies on tests or analyses at other level of assemblies, describe	ardware/software complies with mission the relationships.		
A section of the plan will be an Instrument Performance Verification Matrix summarizing the flow-down of system specification requirements that stipulates how each requirement will be verified, and summarizes compliance/non-compliance with requirements. It will show each specification requirement, the reference source (to the specific paragraph or line item), the method of compliance, applicable procedure references, report reference numbers, etc. The Instrument Performance Verification Matrix may be made a separate document.			
The Instrument Performance Verification Plan will include a section describing the environme level of assembly, configuration of item, objectives, facilities, instrumentation, safety consider and profiles, appropriate functional operations, personnel responsibilities, and requirement analysis activity, include objectives, a description of the mathematical model, assumptions of output, criteria for assessing the acceptability of the results, interaction with related test acti- for an operational methodology for controlling, documenting, and approving activities not par- that prevent accidents that could damage or contaminate hardware or facilities, or cause per- time decision-making mechanisms for continuation or suspension of testing after malfunce requirements, including the assessment of the validity of previous tests. Include a test matrix on each component, each subsystem, and the payload. Include tests on engineering requirements. Define pass/fail criteria. The Environmental Test Plan section will inclu- summarizes all environmental tests that will be performed showing the test an development/engineering models performed to satisfy qualification requirements will be in Verification Plan may be made a separate document rather than be a part of the Instrument I	ental verification program. This will include rations, contamination control, test phases ts for procedures and reports. For each in which the model will be based, required vity, and requirements for reports. Provide t of an approved procedure. Plan controls sonal injury. The controls will include real- tion, and a method for determining retest t that summarizes all tests to be performed models performed to satisfy qualification ude an Environmental Test Matrix which d the level of assembly. Tests on cluded in this matrix. The Environmental Performance Verification Plan		
As an adjunct to the environmental verification program, an Environmental Test Tracking Matrix summarizing all tests performed and showing the test and the level of assembly will be maintained.			
The Instrument Performance Verification Plan will include an Environmental Verification Specification section that stipulates the specific environmental parameters used in each test or analysis required by the verification plan. Contains the specific test and analytical parameters associated with each of the tests and analyses required by the Verification Plan. Payload peculiarities and interactions with the launch vehicle will be considered when defining quantitative environmental parameters under which the hardware elements must meet their performance requirements. The Environmental Verification Specification may be a separate document or it may be included as part of the Instrument Performance Verification Plan.			

Parts Control Plan (PCP)

Title: Par	ts Control Plan (PCP)	CDRL No.: 308		
Referen	ce:			
MA	R Sections 6.1, 6.2.1, 6.2.2, 6.2.3, & 6.2.6			
Use:				
De	scription of developer's approach and methodology for implementation of the Parts Contr	ol Program.		
Related	Documents			
Par	Parts Identification List (PIL)			
Place/Ti	me/Purpose of Delivery:			
The Imp	e PCP will be developed and delivered for GSFC review with, or incorporated into, the elementation Plan. It will be delivered for GSFC approval. Any subsequent revisions must	e developer's Performance Assurance st be delivered to GSFC for approval.		
Prepara	tion Information:			
The PCP will be prepared and will address all EEE parts program requirements. The PCP will contain, as a minimum, detailed discussions of the following:				
a.	a. The developer's plan or approach for conforming to the EEE parts requirements.			
b.	b. The developer's parts control organization, identifying key individuals, and specific responsibilities.			
c.	c. Detailed Parts Control Board (PCB) procedures, to include PCB membership, designation of Chairperson, responsibilities, review and approval procedures, meeting schedules and method of notification, meeting minutes, etc.			
d.	1. Parts tracking methods and approach, including tools to be used such as databases, reports, PIL, etc. Describe system for identifying and tracking parts approval status.			
e.	Parts procurement, processing and testing methodology and strategies. Identify intern incoming inspections, screening, qualification testing, derating, testing of parts pul Analysis, radiation assessments, etc.	al operating procedures to be used for led from stores, Destructive Physical		

Parts Control board (PCB) reports

Title: Parts Control Board Reports	CDRL No.: 309	
Reference:		
MAR Sections 6.2.1.1		
Use:		
Document all PCB meeting minutes		
Related Documents		
Parts Control Plan (PCP)		
Place/Time/Purpose of Delivery:		
PCB reports will be submitted to GSFC for review within five work days after each PCB meet	ting.	
Preparation Information:		
Actions and recommendations from reviews and discussions of all issues effecting EEE parts (e.g., alert findings, DPA results, failure analysis results, qualification basis, screening requirements, etc.) shall be recorded in the PCB reports.		

Parts Identification List (PIL)

Title:	CDRL No.:	
Parts Identification List (PIL)	310	
Reference:		
MAR Sections 6.3 & 6.3.2		
Use:		
Listing of all EEE parts intended for use in spaceflight hardware		
Related Documents		
Parts Control Plan (PCP)		
Place/Time/Purpose of Delivery:		
The PIL will be delivered to GSFC for approval 90 days after contract award. Subsequent re	evisions (with all changes clearly noted revision delivered to GSEC 30 days	
prior to PDR. (Note: The As Built Parts List [ABPL] will be developed from this document/da	atabase and will be submitted to	
GSFC for review 60 days prior to delivery of the end item to the spacecraft contractor and/or	r the Government.)	
Preparation information:		
The PIL will be prepared and maintained throughout the life of the project. The PIL will be component and will include the following information, as a minimum:	compiled by instrument or instrument	
a. Part name		
b. Part number		
c. Manufacturer d Manufacturer's generic part number		
e. Procurement specification		
Any format may be used provided the required information is included. All submissions to GSFC will be provided in an electronic spreadsheet format. A hard copy will accompany the electronic version. Any changes from the last revision shall be clearly noted on the hard copy. (That is, updates to PIL will identify changes from the previous submission.)		
Note: The As-Built Parts List (ABPL) will include the following information in addition to the above	e list:	
a. Lot date code		
b. Quantities		

alert/advisory disposition and preparation

Title:	CDRL No.:		
Alert/Advisory Disposition and Preparation	311		
Reference:			
MAR Sections 6.4			
Use:			
Review and the disposition of GIDEP Alerts and NASA Alerts and Advisories which are	e provided to the Developer by GSFC or		
another source. Prepare, or assist GSFC in preparing, Alerts/Advisories based on part anomalies/conce experience.	erns resulting from the Developer's own		
Related Documents			
Parts Control Plan (PCP)			
Place/Time/Purpose of Delivery:			
Respond to GSFC within 25 calendar days of receipt of Alert/Advisory. Alert/advisory imp technical reviews and PCB meetings. Developer-prepared alerts/advisories will be prepared within 60 days in coordination with	acts, if any, should be discussed at GSFC, as needed.		
Preparation Information:			
Developer will provide an impact statement to GSFC for each Alert or Advisory reviewed developer will provide a narrative plan of action and an implementation date within the 25 caler	 When a negative impact exists, the ndar days listed above. 		
The developer will notify GSFC within 2 workdays of discovering a suspect part/lot. Inform GSFC can assist the developer in preparing an Alert/Advisory, if necessary.	The developer will notify GSFC within 2 workdays of discovering a suspect part/lot. Information will be shared with GSFC so that GSFC can assist the developer in preparing an Alert/Advisory, if necessary.		

Materials, Processes and Lubrication Assurance Plan

Title	CDPL No :
Materials, Processes and Lubrication Assurance Plan	312
Reference:	
MAR Section 7.1	
Use:	
Documents the developer's materials engineering and assurance program	
Related Documents:	
None	
Place/Time/Purpose of Delivery:	
A Plan will be developed and delivered for GSFC review with, or incorporated into, the Implementation Plan. The Plan will be delivered to GSFC for approval. Any subsequent cl GSFC for approval.	developer's Performance Assurance hanges/revisions must be delivered to
Preparation Information:	
The Materials, Processes and Lubrication Assurance Plan will contain:	
 a. Table of contents. b. Organization of materials group, project management group and connecting organization c. Authority and methods of material and lubrication assurance control of hardware drawing d. Failure analysis participation e. Materials review board participation f. Technical skill mix and laboratory capabilities g. The responsibility of materials and lubrication engineering in the design, drawing an fabrication and testing control system utilized by the developer. h. Limited shelf-life materials control program. 	n. g signatures d process control in the engineering,

Materials Usage Agreement

Title:	CDRL No.:	
Materials Usage Agreement	313	
Reference:		
MAR Sections 7.2.1, 7.2.2, 7.2.2.1, 7.2.5.2 and 7.2.6		
Use:		
For usage evaluation and approval of non-compliant materials or lubrication usage.		
Related Documents:		
GSFC -SPEC-522, GSFC-HDBK-527, NHB 1700.7, GMI 1700.3, NASA-STD-6001		
Place/Time/Purpose of Delivery:		
Provide to the GSFC Project Office, with the materials usage lists, 30 days prior to the PDR for GSFC approval. (Note: Additionally, updates, as required, must be provided to GSFC 30 days before the CDR for approval and 30 days before hardware acceptance for approval.)		

Preparation Information:

A Materials Usage Agreement (MUA) will be provided, for each non-compliant off-the-shelf-hardware material usage, non-compliant polymeric material outgassing, flammability or toxicity usage and non-compliant inorganic material stress corrosion cracking usage.

The MUA will be provided on a Material Usage Agreement form, a contractor's equivalent form, or the contractor's electronically transmitted form. The GSFC MUA form is Figure 7-1 in this document.

The MUA form requires the minimum following information: MSFC 527 material rating, usage agreement number, page number, drawing numbers, part or drawing name, assembly, material name and specification, manufacturer and trade name, use thickness, weight, exposed area, pressure, temperature, exposed media, application, rationale for safe and successful flight, originator's name, project manager's name and date.

The off-the-shelf-hardware usage must identify the measures to be used to ensure the acceptability of the hardware such as hermetic sealing, material changes to known compliant materials, vacuum bake-out to the error budget requirements listed in the contamination control plan.

Polymeric Materials and Composites Usage List

Title:	CDRL No.:
Polymeric Materials and Composites Usage List	314
Reference	
MAR Section 7.2.5	
Use: For usage evaluation and approval of all polymeric and composite materials applications.	
Related Documents: NASA RP-1124, ASTM F 595, MSFC-HDBK-527, NHB 1700.7, EWR 127.1, GMI 1700.3, NA	SA-STD-6001
Place/Time/Purpose of Delivery:	
Provide to the GSFC Project Office 30 days before PDR for review. (Note: Additionally, the c 30 days before the CDR for approval and 30 days before hardware acceptance for approval.)	current list must be provided to GSFC)
Preparation Information:	
The developer will provide the information requested via the GSFC polymeric materials and comp developer's form, or an equivalent electronic format. The GSFC form is Figure 7-3 of this docume	posites usage list form, an equivalent :nt.
 The polymeric materials and composites usage list form requires, as a minimum, the following in instrument name, GSFC technical officer, contractor, address, prepared by, phone number, d evaluator, evaluator's phone number, date received, date evaluated, item number (1), material id (4), amount code, expected environment (5), outgassing values and reason for selection (6). (Note 1. List all polymeric materials and composites applications utilized in the system except lapolymeric and composite materials usage list. 2. Give the name of the material, identifying number and manufacturer. For example: E Associates 	formation: spacecraft, subsystem or date of preparation, GSFC materials dentification (2), mix formula (3), cure res 1 through 6 are listed below.) ubricants which should be listed on poxy, Epon 828, E. V. Roberts and
 Provide proportions and name of resin, hardener (catalyst), filler, etc. For example: 828/V14 Provide cure cycle details. For example: 8 hours. at room temperature plus 2 hours. at 1500 Provide the details of the environment that the material will experience as a finished space and in space. List all materials with the same environment in a group. For example: Therm 5 torr, ultraviolet radiation (UV); Storage: Up to 1 year at room temperature; Space: -10C/-electron, proton, atomic oxygen Provide any special reason why the materials was selected. If for a particular property, ple Cost, availability, room temperature curing, or low thermal expansion. 	40/Silflake 135 as 5/5/38 by weight C ecraft component, both in ground test hal vacuum-20C/+60C, 2 weeks, 10E- +20C, 2 years, 150 mile altitude, UV, ease give the property. For example:

Inorganic Materials and Composites Usage List

Title:	CDRL No.:	
Inorganic Materials and Composites Usage List	315	
Reference:		
MAR Section 7.2.6		
Use:		
For usage evaluation and approval of all metal, ceramic, and metal/ceramic composite material applications.		
Related Documents:		
MSFC-HDBK-527, NHB 1700.7, MSFC-SPEC-522		
Place/Time/Purpose of Delivery: Provide to the GSFC Project Office 30 days before PDR for review. (Note: Additionally, the current list must be provided to GSFC 20 days before the CDR for approval and 20 days before bardware accentance for approval.)		
so adys before the obit for approval and so adys before hardware acceptance for approval.		

Preparation Information:

The hardware provider will provide the information requested via the GSFC inorganic materials and composites usage list form, an equivalent developer's form, or an equivalent electronic format. The GSFC form is Figure 7-4 of this document.

The inorganic materials and composite usage list form requires, as a minimum, the following information: spacecraft, subsystem or instrument name, GSFC technical officer, contractor, contractor address, prepared by, phone number, date of preparation, GSFC materials evaluator, evaluator's phone number, date received, item number, materials identification (1), condition (2), application or usage (3), expected environment (4), stress corrosion cracking table number, MUA number and NDE method. (Notes 1 through 4 are listed below.) List all inorganic materials (metals, ceramics, glasses, liquids and metal/ceramic composites) except bearing and lubrication materials which should be listed on Form 18-59C.

- 1. Give materials name and identifying number manufacturer. For example: Aluminum 6061-T6; Electroless nickel plate, Enplate Ni 410, Enthone, Inc.; Fused silica, Corning 7940, Corning Class Works
- 2. Give details of the finished condition of the material, heat treatment designation (hardness or strength), surface finish and coating, cold worked state, welding, brazing, etc. For example: Heat treated to Rockwell C 60 hardness, gold electroplated, brazed; surface coated with vapor deposited aluminum and magnesium fluoride; cold worked to full hard condition, TIG welded and electroless nickel plated.
- 3. Give details of where on the spacecraft the material will be used (component) and its function. For example: Electronics box structure in attitude control system, not hermetically sealed.
- 4. Give the details of the environment that the material will experience as a finished spacecraft component, both during ground testing and in space. Exclude vibration environment. List all materials with the same environment in a group. For example: Thermal vacuum -20C/+60C, 2 weeks, 10E-5 torr, Ultraviolet radiation (UV); Storage Up to 1 year at room temperature; Space 10C/+20C, 2 years, 150 miles altitude, UV, electron, proton, Atomic Oxygen.

Lubrication Usage List

Tit	le:	CDRL No.:	
	Lubrication Usage List	310	
Ref	erence:	•	
	MAR Section 7.2.7		
Use	x:		
Del	For evaluation and approval of all lubricant usage and applications.		
Rei	ated Documents:		
Pla	None		
r iau			
	Provide to the GSFC Project Office 30 days before PDR for review. (Note: Additiona 30 days before the CDR for approval and 30 days before hardware acceptance for approval and	Ily, the current list must be provided to GSFC proval.)	
Pre	paration Information:		
The or a	hardware developer will provide the information requested via the GSFC lubricant usan equivalent electronic format. The GSFC form is Figure 7-5 of this document.	age list form, an equivalent developer's form,	
The tech eva mar tem belo	The lubricant usage list form requires, as the minimum, the following information: spacecraft, subsystem or instrument name, GSFC technical officer, contractor, contractor address, prepared by, phone number, date of preparation, GSFC materials evaluator, evaluator's phone number, date received, item number, component type, size, material (1); component manufacturer and manufacturer identification; proposed lubrication system and amount of lubrication; type and number of wear cycles (2); speed, temperature and atmosphere of operation (3); type and magnitude of loads (4) and other details (5). (Notes 1 through 5 are listed below.)		
1.	Ball bearing (BB), Sleeve bearing (SB), Gear (G), Sliding surfaces (SS), or Sliding identification of materials used for the component. For example: 440C steel, PTFE.	ng electrical contacts (SEC). Give generic	
2.	2. Continuous unidirectional rotation (CUR), continuous oscillation (CO), intermittent rotation (IR), intermittent oscillation (IO), sma angle (less than 30°) oscillation (SAM), large angle (greater than 30°) oscillation (LAM), continuous sliding (CS), or intermitten sliding (IS). State the number of wear cycles: 1 to 1E2 ("A"), 1E2 to 1E4 ("B"), 1E4 to 1E6 ("C"), or greater than 1E6 ("D").		
3.	3. State speed: as revolution per min. (RPM), oscillations per min. (OPM), variable speed (VS), or sliding speed in cm. per minute (CPM). State operational temperature range atmosphere as: vacuum, air, gas sealed or unsealed and pressure.		
4.	4. Type of loads: axial, radial, tangential (gear load). Give magnitude of load.		
5.	For ball bearings, give type and material of ball cage, number of shields, and type of surface treatment and hardness. For sleeve bearings, give the bore diameter and wide	ball groove surface finishes. For gears, give dth. Provide the torque and torque margins.	

Material Process Utilization List

Title: Material Process Utilization List	CDRL No.:	
Material Process Outization List	517	
Reference:		
MAR Section 7.3		
Use:		
For usage evaluation and approval of all material processes that are used to fabricate, clean, flight hardware.	store, integrate, and test the space	
Related Documents:		
None		
Place/Time/Purpose of Delivery:		
Provide to the GSFC Project Office 30 days before PDR for review. (Note: Additionally, the of 30 days before the CDR for approval and 30 days before hardware acceptance for approval.) submitted to the GSFC Project Office upon request.	current list must be provided to GSFC A copy of any process will be	
Preparation Information:		
The developer will provide the information requested via the GSFC material process utilization list or an equivalent electronic format. The GSFC form is Figure 7-6 of this document.	t form, an equivalent developer's form,	
The material process utilization list requires, as a minimum, the following information: spacecraft, subsystem or instrument name, GSFC technical officer, contractor, address, prepared by, phone number, date of preparation, GSFC materials evaluator, evaluator's phone number, date received, date evaluated, item number, process type (1), contractor spec. number (2), Military, ASTM, Federal or other specification number, description of material processed, (3) and spacecraft/instrument application (4). (Notes 1 through 4 are listed below.)		
 Give the generic name of the process. For example: anodizing (sulfuric acid) If the process is proprietary, please state so. Identify the type and condition of the material subjected to the process. For example: 6061-T6 Identify the component or structure for which the materials are being processed. For example: Antenna dish. 		
All welding and brazing of all flight hardware, including repairs, shall be performed by certified operators in accordance with the requirements of the appropriate industry or government standards. A copy of the procedure qualification record (PQR) and a current copy of the operator qualification test record shall be provided along with the Materials Process Utilization List.		

Failure Mode and Effects Analysis (FMEA) and Critical Items List (CIL)

Title: Failure Mode and Effects Analysis (FMEA) and Critical Items List (CIL)	CDRL No.: 318	
Reference:		
MAR Section 8.2.1		
Use:		
Reliability analysis to evaluate the design relative to requirements, identify single point failur	es, and identify hazards.	
Related Documents		
 a. Procedures for Performing an FMEA, S-302-89-01, February 1990. b. CR 5320.9, Payload and Experiment Failure Mode Effects Analysis and Critical Items I c. MIL-STD 1629A, Procedures for Performing an FMECA, DoD. 	ist Ground Rules, MSFC.	
Place/Time/Purpose of Delivery:		
Provide a preliminary draft to the GSFC Project Office 30 days before PDR for review. (Note: Additionally, the final version must be provided to GSFC 30 days before the CDR for review.) Updates, as required, will be delivered to GSFC for review. Changes from previous versions should be clearly noted on the updates and final versions.		
Preparation Information:		
The FMEA report will document the study including the approach, methodologies, results, conclusions, and recommendations. The report will include objectives, level of the analysis, ground rules, functional description, functional block diagrams, reliability block diagrams, bounds of equipment analyzed, reference to data sources used, identification of problem areas, single-point failures, recommended corrective action, and work sheets as appropriate for the specific analyses being performed.		
The CIL will include item identification, cross-reference to FMEA line items, and retention rationale. Appropriate retention rationale may include design features, historical performance, acceptance testing, manufacturing product assurance, elimination of undesirable failure modes, and failure detection methods.		

Limited-Life Items

Title: Limited-Life Items	CDRL No.: 319
Reference:	
MAR Section 8.4	
Use:	
Defines and tracks the selection, use, and wear of limited-life items and their impact on missi	ion operations.
Related Documents	
None	
Place/Time/Purpose of Delivery:	
Provide to the GSFC Project Office 30 days before PDR for review. (Note: Additionally, the 30 days before the CDR for approval. Updates must be submitted to GSFC for approval as t	current list must be provided to GSFC they are released.)
Preparation Information:	
List interimined items and their impact of mission parameters. Define expected life, required life and using the items. Include selected structures, thermal control surfaces, solar arrays, and e oxygen, solar radiation, shelf-life, extreme temperatures, thermal cycling, wear and fatigue are us surfaces and structural items. When aging, wear, fatigue and lubricant degradation limit their life bearings, valves, tape recorders, momentum wheels, gyros, actuators and scan devices. Assign and reporting activities.	, duty cycles, and rationale for selecting electromechanical mechanisms. Atomic sed to identify limited-life thermal control e; include batteries, compressors, seals, responsibilities and describe managerial

Quality Manual

Title:	CDRL No.:	
Quality Manual	320	
Reference:		
MAR Section 9.0		
Use:		
Documents the developer's quality management system.		
Related Documents:		
ANSI/ASQC Q9001-1994, Section 4.2.1		
Place/Time/Purpose of Delivery:		
Provide developer's Quality Manual and any updates to GSFC Project Office for review within 90 days of contract signing. The documentation may be available by electronic copy, by hard copy, or via the web. Provide any evidence of 1st, 2nd, or 3rd party certification/registration.		
Preparation Information:		
Prepare a Quality Manual addressing all applicable requirements (from the 20 total elements) of ANSI/ASQC Q9001-1994. Refer to ISO 10013 for further guidelines on preparation of a quality manual.		
The Quality Manual will comply with Q9001 and it will contain:		
a. The title, approval page, scope, and the field of applicationb. Table of contents		
 c. Introductory pages about the organization concerned and the manual itself d. The quality policy and objectives of the organization 		
 e. The description of the organization, responsibilities, and authorities including the organization responsible for the EEE parts, materials, roliability, safety and test requirements implementation. 		
 f. A description of the elements of the quality system, developer policy regarding each element and developer implementation procedure for each Q9001 element or reference(s) to approved quality system procedures. System level procedures will address the implementation of all requirements cited in this document. g. A definitions section, if appropriate 		
h. An appendix for supportive data, if appropriate.		
Quality Manual issuance and change will be implemented by a controlled process. The Quality Manual will be maintained/updated by the developer throughout the life of the contract.		

NONCONFORMANCE Reports (NCR's)

Title: Nonconformance Reports	CDRL No.: 321	
Reference:	I	
MAR Section 9.1.2		
Use:		
To report failures promptly for determination of cause and corrective action.		
Related Documents:		
GPG 5340.2, GPG 1710.1, GPG 4520.2, GPG 5100.1, GPG 5900.1, 302-PG-1410.2.1		
Place/Time/Purpose of Delivery:		
 a. Provide for information to the GSFC Project Office within 24 hours of each occurrence; b. Provide updates for review to the GSFC Project Office at the completion of analysis and c. Provide to GSFC Project Office for approval immediately after developer closure. 	d assignment of corrective action;	
Preparation Information:		
Reporting of failures will begin with the first power application at the major component, subsystem, or instrument level or the first operation of a mechanical item. It will continue through formal acceptance by the GSFC Project Office and the post-launch operations, commensurate with developer presence and responsibility at GSFC and launch site operations.		
All failures at GSFC will be documented via the GSFC NCR/CR database.		
Non-GSFC developers, need to provide copies of failure, problem, nonconformance, and/or anomaly reports per the delivery schedule listed above. The developer's forms may be used but should include information equivalent to that stored in the GSFC NCR/CR database. The developer will provide the GSFC Project Office with any/all Material Review Board (MRB) and Failure Review Board (FRB) documentation including minutes and reports.		

Contamination Control Plan

TH			
The	: Contamination Control Plan	CDRL NO.: 322	
Refe	Prence:		
	MAR Sections 10.1 & 10.2		
Use	-		
	To establish contamination allowances and methods for controlling contamination		
Rela	ted Documents:		
	None		
Plac	e/Time/Purpose of Delivery:		
Provide a preliminary draft to the Project Office 30 days before PDR for GSFC review. (Note: Provide a final draft to the Project Office 30 days before the CDR for approval.)			
Pre	paration Information:		
Data on material properties, design features, test data, system tolerance of degraded performance, and methods to prevent degradation will be provided to permit independent evaluation of contamination hazards. The items should be included in the plan for delivery: The CCP should cover:			
1.	Materials		
	a. Outgassing as a function of temperature and timeb. The nature of outgassing chemistryc. Areas, weight, location, and view factors of critical surfaces		
2.	Venting: size, location and relation to external surfaces.		
3.	3. The thermal vacuum test contamination monitoring plan including vacuum test data, QCM location, temperature and pressure data, system temperature profile, and shroud temperature.		
4.	4. On orbit spacecraft and instrument performance as affected by contamination deposits including		
	 a. Contamination effect monitoring b. Methods to prevent and recover from contamination in orbit c. How to evaluate in orbit degradation d. Photopolymerization of outgassing products on critical surfaces e. Space debris risks and protection f. Atomic oxygen erosion and re-deposition 		
5.	5. Analysis of contamination impact on the satellite's on-orbit performance.		
6.	6. In orbit contamination impact from other sources such as adjacent instruments.		

ELECTRONIC COPIES OF REQUIREMENTS DOCUMENTS

Title: Electronic Copies of Requirements Documents	CDRL No.: 323	
Reference:		
MAR Sections 1.10		
Use: Developer-prepared requirements documents will be analyzed using the Automated Requirement Measurement (ARM) Tool that was developed at GSFC for use as an early life cycle aid to identify areas of a requirements specification document that can be improved.		
Related Documents:		
None		
Place/Time/Purpose of Delivery:		
All developer-prepared requirements documents (e.g., LAT specifications, management plans, the instrument performance verification plan, the PAIP and its associated documentation such as the Risk Management Plan and System Safety Program Plan will be delivered electronically to the GSFC Project Office for analysis/review. Documents will be delivered at the time of major draft releases, prior to their formal acceptance.		
Preparation Information:		
The documentation will be delivered to GSFC using a format and media negotiated between the developer and the GSFC Project Office. (Note: This same tool will be used to analysis GSFC-developed requirements documents.) A GSFC document analysis report will be delivered to the developer for their consideration prior to the document's formal release.		

RISK MANAGEMENT PLAN

Title: Risk Management Plan	CDRL No.: 324	
Reference:		
MAR Section 12.1		
Use:		
To document the developer's approach to implementing a risk management program.		
Related Documents:		
NPG 7120.5A, Section 4.2 Website http://satc.gsfc.nasa.gov/crm/ for Risk Management Plan templates and sample plans		
Place/Time/Purpose of Delivery:		
Deliver to GSFC with, or as part of, the Performance Assurance Implementation Plan for approval. Any subsequent revisions must be approved by GSFC.		
Preparation Information:		
Section 1. Introduction 1.1 Purpose and Scope 1.2 Assumptions, Constraints, and Policies 1.3 Related Documents and Standards Section 2. Overview of Risk Management Practice 2.1 Overview 2.2 Process and Data Flows 2.3 Project Management Integration (optional) Section 3. Organization 3.1 Organizational Chart 3.2 Project Communication and Responsibilities 3.3 AA Program Responsibilities 3.4 Contractor Responsibilities Section 4. Practice Details 4.1 Establishing Baselines and Reestablishing Baselines 4.2 Identifying Risks 4.3 Analyzing Risks 4.5 Tracking and Control of Risks 5.1 Collection of Metrics 4.6 Summary of Methods and Tools Section 5. Resources and Schedule of Risk Management Milestones Section 6. Documentation of Risk Information		

Information Needed to Prepare Probabilistic risk assessment (PRA)

Title: Information Needed to Prepare Probabilistic Risk Assessment (PRA)	CDRL No.: 325	
Reference:		
MAR Section 12.2		
Use:		
For systems under development, to guide trade-offs between reliability, cost, performance, and other tradable resources. For mature systems, to support decision-making on risk acceptability, and on choices among options for risk reduction.		
Related Documents:		
None		
Place/Time/Purpose of Delivery:		
As required (for information) for the Government to prepare the PRA prior to PDR (and CDR) plus updates as required.		
Preparation Information:		
The developer and their collaborators will provide the information necessary, including parts lists, functional diagrams, and schematics, for the Government to prepare the PRA.		

Information Needed to Prepare Fault tree analysis

Title:	CDRL No.:	
Information Needed to Prepare Fault Tree Analysis (FTA)	326	
Reference:		
MAR Section 12.2		
Use:		
A top down approach for identifying hardware critical failure modes.		
Related Documents		
Nuclear Regulatory Commission publication NUREG-0492, Fault Tree Handbook		
Place/Time/Purpose of Delivery:		
As required (for information) for the Government to prepare the FTA prior to PDR (and CDR) plus updates as required.		
Preparation Information:		
The developer and their collaborators will provide the information necessary, including parts lists, functional diagrams, and schematics, for the Government to prepare the FTA.		

Information Needed to Prepare Risk assessment

Title: Information Needed to Prepare Risk Assessment	CDRL No.: 327	
Reference:		
MAR Section 12.3		
Use:		
To determine risks inherent in the project at any one time and identify possible risk mitigation strategies for those risks. Related Documents		
None		
Place/Time/Purpose of Delivery:		
For information, 30 days after a request for information/data from the Government.		
Preparation Information:		
The government will provide a notification to the developer of the scope and/or area of focus of the risk assessment 30 days prior to the assessment. The assessment will focus on products (e.g., hardware and/or software) and/or processes (e.g., design, configuration management, manufacturing, coding, testing). The developer and their collaborators will provide access to the information necessary to support the scope of the assessment.		