

0012
CH-9

GSFC-422-20-06

**RFP 5-14160/502
ATTACHMENT C**

CONTRACT DOCUMENTATION REQUIREMENTS LIST

MODIS-N INSTRUMENT

October 12, 1990

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

CHANGE RECORD PAGE

DOCUMENT TITLE: EOS Project Contract Documentation Requirements
List (CDRL) MODIS-N Instrument

DOCUMENT DATE: October 12, 1990

ISSUE	DATE	PAGES AFFECTED	DESCRIPTION
CH-01	10/24/91	Part B, page 11, Part C, page's 17 & 160	Approved by CCR 422-21-003
CH-02	10/24/91	Part B, page's 4 & 5	Approved by CCR 422-21-004
CH-03	01/24/92	Acronym Listing page, Part B, page's 5, 9-11 Part C, page's 18, 34, 35, 75, 119, 135, 136, 140, 142, 157, 166 & 172	Approved by CCR 422-21-015
CH-04	05/14/92	Pages i-viii, Part A, page's 1 & 2, Part B, page's 4-8, 12 & 13, Part C, page's 14-21, 24-29, 32, 34, 35, 37, 40, 42, 43, 45, 46, 48-52, 54, 59-61, 65, 67, 73, 77, 80-88, 91-93, 96-98, 100, 102, 104-107, 110-113, 115-117, 119, 121-123, 126, 128, 132-135, 137-139, 142, 145, 147, 148, 150, 152, 162, 163, 168, 176, 178, 179, 182, 185, 186, 189, 191, 192, 194, 200, 201, 205, 206, 209-216	Approved by CCR 421-12-04-003
CH-05	07/14/92	Page's i, ii, & Part C, page 91	Approved by CCR 421-12-04-007
CH-06	09/03/92	Page's i, ii, and iii, Part A, page 3, Part B, page 11, Part C, page's 32, and 177	Approved by CCR 421-12-04-014
CH-07	09/03/92	Page's i, ii, and iii, Part A, page 1, Part C, page's 29, 31, 91, 92, 93, 97, 98, 156, 177, 184, and 187	Approved by CCR 421-12-04-015
CH-08	09/30/92	Page's i, ii, and Part B, page 10	Approved by CCR 421-12-04-018
CH-09	01/06/93	Page's i, ii, Part B, page 5 and 10, and Part C, page 132	Approved by CCR 421-12-04-022

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Document Title: MODIS-N Instrument Contract Documentation Requirements
List (CDRL), 422-20-06

Release Date: October 12, 1990

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ACRONYM LISTING

<u>ACRONYM</u>	<u>DEFINITION</u>	
BCU	Bench Check Unit	
CAGE	Commercial and Government Entity	
CCB	Configuration Control Board	
CCR	Configuration Change Request	
CDR	Critical Design Review	
CDRL	Contract Documentation Requirements List	
CIL	Critical Item List	
CMO	Configuration Management Officer	
CMP	Configuration Management Plan	
CPR	Calibration Peer Review	
DID	Data Item Description	
DOD	Department of Defense	CH-04
DPA	Destructive Physical Analysis	CH-04
EAR	Engineering Analysis Reports	
EM	Engineering Model	CH-04
EOS	Earth Observing System	
EOSDIS	Earth Observing System Data and Information System	
ESD	Electrostatic Discharge	
FAR	Federal Acquisition Regulation	CH-04
FMEA	Failure Modes and Effects Analysis	
FOV	Field-of-View	CH-04

ACRONYM LISTING (Cont'd)

<u>ACRONYM</u>	<u>DEFINITION</u>	
GFE	Government Furnished Equipment	
GFP	Government Furnished Property	
GHB	Goddard Handbook	
GIDEP	Government-Industry Data Exchange Program	
GIIS	General Instrument Interface Specification	
GSE	Ground Support Equipment	
GSFC	Goddard Space Flight Center	
LCSP	Launch Complex Safety Plan	CH-04
MODIS-N	Moderate Resolution Imaging Spectrometer - Nadir	CH-04
MRB	Material Review Board	
MSFC	Marshall Space Flight Center	
NASA	National Aeronautics and Space Administration	CH-04
NSDS	NASA Software Documentation Standard	CH-03
NHB	NASA Handbook	
NE Δ T	Noise Equivalent Temperature	CH-04
NSPAR	Non-standard Part Approval Request	
OHA	Operations Hazard Analysis	CH-04
PAIP	Performance Assurance Implementation Plan	
PAR	Performance Assurance Requirements	
PDR	Preliminary Design Review	

ACRONYM LISTING (Cont'd)

<u>ACRONYM</u>	<u>DEFINITION</u>	
PERT	Program Evaluation and Review Technique	
PFM	Protoflight Model	
PMS	Performance Measurement System	
PMSR	Performance Measurement Status Report	
POER	Post-Environmental Review	CH-04
PRER	Pre-Environmental Review	
PSR	Pre-Ship Review	
QA	Quality Assurance	
RFP	Request For Proposal	CH-04
SMAP	Software Management and Assurance Program	
SMR	Software Management Review	CH-04
SNR	Signal Noise Ratio	
SOW	Statement of Work	
SSR	System Study Review	
STE	System Test Equipment	
SWAR	Software Acceptance Review	
SWCDR	Software Critical Design Review	
SWPDR	Software Preliminary Design Review	
SWTRR	Software Test Readiness Review	
UIID	Unique Instrument Interface Document	
WBS	Work Breakdown Structure	

ACRONYM LISTING (Cont'd)

<u>ACRONYM</u>	<u>DEFINITION</u>
WSMC	Western Space and Missile Center
WSMCR	Western Space Missile Command Requirements

**CONTRACT DOCUMENTATION REQUIREMENTS LIST
FOR THE
MODIS-N INSTRUMENT**

Part A. INTRODUCTION, DEFINITIONS, AND DISTRIBUTION INSTRUCTIONS

1. INTRODUCTION

This document defines the requirements for deliverable documentation to be provided by the MODIS-N contractor. Part A includes the introduction, definitions, and instructions for mailing and/or distribution. Part B presents the Contract Documentation Requirements Lists (CDRL) item by item, with due dates, quantity, and a distribution key. Part C has a list of the items sorted by title followed by a description of each item and describes use, preparation information, etc. Except where specifically indicated to the contrary, the formats and drawing standards used shall be those normally used by the MODIS-N Contractor and/or by its subcontractors.

| CH-04

This document includes that subset of CDRLs that pertains to areas discussed in the following EOS and MODIS-N documents:

| CH-04

- a. EOS Project Configuration Management Plan, 420-02-02, dated January 1990
- b. EOS Performance Assurance Requirements (PAR) for General Instruments, 420-05-01, (see NAS5-30800, Section J.1) | CH-07
- c. EOS Project Calibration Management Plan, 420-03-01, dated January 30, 1990
- d. Specification for the Moderate-Resolution Imaging Spectrometer - Nadir, 422-20-02
- e. Earth Observing System (EOS) Moderate-Resolution Imaging Spectrometer - Nadir (MODIS-N) Software Management Requirements, 422-20-04, dated March 5, 1990
- f. Unique Instrument Interface Document for MODIS-N
- g. General Instrument Interface Specification for the EOS Observatory, 420-03-02, (see NAS5-30800, Section J.1) | CH-07
- h. MODIS-N Statement of Work, 422-20-03
- i. MODIS-N Work Breakdown Structure, 422-20-01
- j. Schedule Management Handbook for the Flight Projects Directorate, FPRO 1010, dated March 28, 1991 | CH-04

3. MAILING AND/OR DISTRIBUTION

The following distribution addresses and quantities apply to the "Distribution" and "Quantity" columns in Part B:

<u>Distribution</u>	<u>GSFC Addressees</u>		
A	Documentation shall be submitted with the proposal in accordance with Section L of the Request for Proposal.		
B	In accordance with the contract clauses.		
C	<u>No. of Copies</u>	<u>Addressee</u>	<u>GSFC Code</u>
	1	Contracting Officer	284.4
	1	Technical Officer	421
	Balance	Configuration Mgmt. Officer	421

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4. DEFINITION OF CATEGORIES

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

- A. Approval -- Documents in this category require written GSFC approval prior to use. Receipts by GSFC shall occur within the time specified in the contract. Requirements for resubmission shall be as specified in letter(s) of disapproval.

- R. Review -- Documents in this category require receipt by GSFC prior to use and within the time period specified in the contract. They are subject to evaluation by GSFC or its designated representatives to determine contractor effectiveness in meeting contract objectives. When Government evaluations reveal inadequacies, the contractor will be directed to correct the documents.

- I. Information -- Documents in this category require receipt by GSFC within the time period specified in the contract for the purpose of determining current program status, progress, and future planning requirements.

Part B. DOCUMENTATION LISTING0. PLANS AND REVIEW DATA PACKAGES (0XX SERIES)

<u>NO.</u>	<u>DOCUMENT</u>	<u>DUE DATE, MATURITY</u>	<u>QTY.</u>	<u>DIST.</u>	<u>SUB CAT</u>
001	Management Plan	Proposal, Final	A	A	A
002	Project Organization Chart	Proposal, Final	A	A	A
003	Performance Measurement System Implementation Plan and System Description	Proposal, Final	A	A	A
004	Detailed Schedules	Proposal, Prelim PMS Review, Baseline As Generated, Update	A 5 5	A C C	R A A CH-04
005	Configuration Management Plan	Prior to Contract Award, Final	5	C	A
006	Performance Assurance Implementation Plan (PAIP)	Proposal, Prelim Prior to Contract Award, Final As generated, Update	A 5 5	A C C	I A A CH-04
007	Contamination Control Plan	Proposal, Prelim 30 days prior to PDR, Interim 30 days prior to CDR, Final As generated, Update	A 5 5 5	A C C C	I R A R CH-04
008	Software Management Plan	Proposal, Prelim SSR + 2 Weeks, Baseline SWPDR, Rev	A 5 5	A C C	R A A CH-02
009	Sustaining Engineering and Operations Plan	Proposal, Prelim SSR, Final SWPDR, Rev	A 5 5	A C C	R A A
010	Make or Buy Plan	Proposal, Final	A	A	A
011	New Technology Reporting Plan	Prior to Contract Award, Final	B	B	A
012	Small Business and Small Disadvantaged Business Concerns Subcontracting Plan	Prior to Contract Award, Final	B	B	A
013	Safety and Health Plan	Prior to Contract Award, Final	B	B	A
014	System Study Review (SSR) Data Package	SSR, Final	50	C	R
015	Updated WBS Diagram and Task Description	SSR,, Prelim PDR, Final	5 5	C C	I A
016	Preliminary Design Review (PDR) Data Package	PDR, Final	50	C	I
017	Software Preliminary Design Review (SWPDR) Data Package	SWPDR, Final	50	C	I
018	Calibration Management Plan	Proposal, Prelim PDR, Final	A 15	A C	I A

Part B. DOCUMENTATION LISTING (CONTINUED)0. PLANS AND REVIEW DATA PACKAGES (0XX SERIES) - Cont'd

<u>NO.</u>	<u>DOCUMENT</u>	<u>DUE DATE, MATURITY</u>	<u>QTY.</u>	<u>DIST.</u>	<u>SUB CAT</u>
019	Calibration Peer Review (CPR) Data Package	Each CPR, Final	50	C	R
020	Critical Design Review (CDR) Data Package	CDR, Final	50	C	I
021	Software Critical Design Review (SWCDR) Data Package	SWCDR, Final	50	C	I
022	Performance Verification Plan	Proposal, Prelim PDR, Rev CDR, Final	A 15 15	A C C	I R A
023	Fabrication and Assembly Flow Plan	30 days prior to PDR, Prelim 30 days prior to CDR, Final	5 5	C C	R R
024	Storage and Storage Testing Plan	Proposal, Prelim CDR, Final	A 15	A C	I A
025	In-Flight Checkout Plan	PDR, Prelim CDR, Final	5 5	C C	R A
026	Software Test Readiness Review (SWTRR) Data Package	SWTRR, Final	15	C	I
027	EM Test Review Data Package	EM Test Review, Final	5	C	A CH-09
028	Software Acceptance Review (SWAR) Data Package	SWAR, Final	15	C	I
029	Pre-Environmental Review (PRER) Data Package	PRER, Final	5	C	I
030	Post-Environmental Review (POER) Data Package	POER, Final	5	C	I
031	Pre-Storage Review Data Package	Prior to storage of each FM, Current	5	C	I
032	Pre-Ship Review (PSR) Data Package	PSR, Final	15	C	I
033	Software Test Plan	Proposal, Prelim SWPDR, Baseline SWCDR, Rev As generated, Update	A 15 15 15	A C C C	R A CH-03 A R CH-04
034	Launch Complex Safety Plan	Instrument delivery to integration contractor, Prelim 120 days prior to observatory delivery to WSMC, Final	5 5	C C	R A CH-04

Part B. DOCUMENTATION LISTING (CONTINUED)0. PLANS AND REVIEW DATA PACKAGES (0XX SERIES) - Cont'd

<u>NO.</u>	<u>DOCUMENT</u>	<u>DUE DATE, MATURITY</u>	<u>QTY.</u>	<u>DIST.</u>	<u>SUB CAT</u>
035	Spares Program Plan	Proposal, Prelim	A	A	I
		Prior to Contract			
		Award, Final	5	C	A
		PDR, Rev	5	C	R
036	Schedule Management Plan	PMS Review, Prelim	5	C	A
		PMS Review+ 60 days, Final	5	C	A
037	Level 1 Master Schedule	Monthly, Current	3	C	R
038	Rolling Wave Schedule	Monthly, Current	3	C	R
039	Non-Ionizing Radiation Source Usage Plan	CDR, Final	5	C	R
		As Generated, Update	5	C	R
040	Software Requirements Review (SWRR) Data Package	SWRR, Final	25	C	I

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1. MATH MODELS AND ANALYSES (1XX SERIES)

101	Radiometric Math Model	PDR, Prelim	3	C	I
		CDR, Final	3	C	R
102	Structural Math Model	PDR, Prelim	3	C	I
		CDR, Final	3	C	R
103	Thermal Math Model	PDR, Prelim	3	C	I
		CDR, Final	3	C	R
104	Engineering Analyses Reports	As Generated, Final	5	C	I
105	Contractor-Generated Internal Technical Memoranda	As Generated, Current	5	C	I
106	Hazard Analyses	PDR, Prelim	5	C	R
		CDR, Final	5	C	R
107	Operations Hazards Analyses	30 days prior to an activity or use of a facility	5	C	R
108	Failure Modes and Effects Analysis (FMEA)	30 days prior to PDR, Prelim	5	C	R
		30 days prior to CDR, Final	5	C	R
		Class I change submittal, Final	5	C	R
109	Parts & Devices Stress Analyses	Update As Generated, Final		(Maintain on-site)	I
110	Reliability Assessment	30 days prior to PDR, Prelim	15	C	I
		30 days prior to CDR, Final	15	C	I
		Class I change submittal, Final	15	C	I
111	Trend Analysis (List of Parameters to be Monitored)	CDR, Final	15	C	R
112	Worst Case Analyses	As Generated , Current	5	C	R

Part B. DOCUMENTATION LISTING (CONTINUED)

113	Stress Analysis Report	PDR, Prelim	5	C	I	CH-04
		CDR, Update	5	C	I	
		As Generated, Update	5	C	I	

2. ENGINEERING AND TEST REPORTS (2XX SERIES)

<u>NO.</u>	<u>DOCUMENT</u>	<u>DUE DATE, MATURITY</u>	<u>QTY.</u>	<u>DIST.</u>	<u>SUB CAT</u>
201	Previously Designed, Fabricated, or Flown Hardware Data	Proposal, Prelim CDR, Final	A 5	A C	I A
202	Data on Uncured, Out-of-Date Materials	30 days prior to material usage, Final	5	C	A
203	Configuration Management Status Report	Monthly, Current	5	C	I
204	Performance Assurance Status Report	Monthly, Final	5	C	I
205	Audit Reports	As Generated, Final	5	C	I
206	Component and Subassembly Test Reports for Subcontracted Items	As Generated, Final	5	C	I
207	Engineering Test Reports	As Generated, Final	5	C	R
208	Performance Verification Reports	30 days after end of Test/Activity, Final	5	C	R
209	Malfunction/Failure Reports: Notifications:	Oral Within 24 Hours to Technical Officer and Flight Assurance Manager, Prelim Written Within 3 working days, Final	N/A 5	N/A C	I I
	Analysis & Proposed Action:	As Generated, Final	5	C	R
210	MRB Decisions on Non-Conformance	Update As Generated, Final	5	C	I
211	Problem and Failure Report Close-out	Completion of the Required Actions, Final	5	C	A
212	Alerts	As Generated, Final	5	C	R
213	Responses to Alerts	10 working days after receipt of Alert, Current	5	C	R
214	Responses to NASA Problem Notices	10 working days after receipt of notification, Current	5	C	R
215	Trend Analysis Reports (Monitoring of Selected Parameters)	PRER, Final PSR, Final As Generated (within 10 days of trend detection), Current	15 15 15	C C C	I I I
216	Hazard Control Verification Report	PRER, Final	5	C	R

Part B. DOCUMENTATION LISTING (CONTINUED)2. ENGINEERING AND TEST REPORTS (2XX SERIES) - Cont'd

<u>NO.</u>	<u>DOCUMENT</u>	<u>DUE DATE, MATURITY</u>	<u>QTY.</u>	<u>DIST.</u>	<u>SUB CAT</u>
217	Software Test Reports	SWTRR, Final SWAR, Final	15 15	C C	R R
218	Data on Non-Conventional Application of Materials	30 days prior to material usage, Final	5	C	A
219	Instrument Output Data Records Required in Special Data Requirements Section of the MODIS-N Specification	Update as Generated, Final	2	C	I
220	Other Technical Reports and Reissued Reports	Update As Generated, Final	5	C	I
221	Storage Testing Reports	Update As Generated, Final	5	C	I
222	Specification Compliance and Calibration Data Books	After EM Test, Final PSR for PFM, Final PSR for FM #1, Final PSR for FM #2, Final	30 30 30 30	C C C C	R R R R
223	New Technology Reports	Update As Generated, Final	B	B	I
224	Safety Compliance Data Package	PDR, Prelim 30 days prior to CDR, Final 120 days prior to Observatory delivery to WSMC, Update	15 15 15	C C C	R A A
225	Responses to Formal Actions	30 days after receipt of action from GSFC, Final	5	C	R
226	Final Report-Design Through Flight Evaluation	T+5 .5 mo, Prelim T+7 mo, Final	5 75	C C	A I

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Part B. DOCUMENTATION LISTING (CONTINUED)3. SPECIFICATIONS AND OPERATION (3XX SERIES)

<u>NO.</u>	<u>DOCUMENT</u>	<u>DUE DATE, MATURITY</u>	<u>QTY.</u>	<u>DIST.</u>	<u>SUB CAT</u>	
301	Specifications on Parts Materials, Subassemblies/ Subsystems	PDR, Prelim	5	C	R	
		Update As Generated, Final	5	C	R	
302	Instrument Functional Logic Diagrams	Proposal, Prelim	A	A	I	
		PDR, Final	5	C	R	
303	Command List and Description	Proposal, Prelim	A	A	I	
		PDR, Final	5	C	R	
304	Engineering Drawings for Materials Applications	15 days after request, Final	5	C	R	
305	Engineering Telemetry Description	PDR, Final	5	C	R	
		CDR, Update	5	C	R	
306	Software Product Specifications in accordance with MODIS-N Software Management Requirements (422-20-04) Table 4-1	Preliminary, Proposal	5	C	R	CH-03
		Baseline, SSR	5	C	A	
		Revisions, SWPDR	5	C	A	
307	Operation and Maintenance Manuals	At start of EM System Integration, Final	5	C	A	
308	Performance Verification Specification	Proposal, Prelim	A	A	R	
		PDR, Update	15	C	R	
		CDR, Final	15	C	A	
309	Software Assurance Specifications in accordance with MODIS-N Software Management Requirements (422-20-04) Table 4-1	Preliminary, Proposal	5	C	R	CH-03
		Baseline, SSR	5	C	A	
		Revisions, SWPDR	5	C	A	

Part B. DOCUMENTATION LISTING (CONTINUED)4. PROCEDURES (4XX SERIES)

<u>NO.</u>	<u>DOCUMENT</u>	<u>DUE DATE, MATURITY</u>	<u>QTY.</u>	<u>DIST.</u>	<u>SUB CAT</u>
401	Standard Practices and Procedures	Proposal, Final	A	A	R
402	Software Standards and Procedures	Proposal, Prelim SSR, Final SWPDR, Rev	A 5 5	A C C	R A A
403	DPA Procedures	Proposal, Final	A	A	A
404	Operational In-Flight Calibration Procedures	CDR, Prelim End of EM Tests, Final	30 5	C C	R CH-08 R
405	General Operating Command Procedures	PDR, Prelim End of EM Tests, Final	5 5	C C	R R
406	Transportation and Handling Procedures	30 days prior to CDR, Prelim 30 days prior to use, Final	5 5	C C	I A
407	Storage Testing Procedures	CDR, Prelim End of EM Tests, Final	5 5	C C	R A
408	Control of Unscheduled Activities (Integration/Verification Testing)	CDR, Final	5	C	R
409	Detailed Test Procedures	75 days prior to EM, PFM, or FM subsystem or system tests, Final	5	C	R
410	Detailed Ground Calibration Procedures	75 days prior to EM, PFM, or FM subsystem or system tests, Final	5	C	R
411	GSE Test Procedures	10 days prior to test of STE, Final	5	C	R CH-09
412	Performance Verification Procedures	30 days prior to each activity, Final	5	C	R
413	Assembly Procedures	Update As Generated, Final	5	C	R
414	Standard Repair Procedures	Update As Generated, Final	5	C	A
415	Software Test Procedures	Preliminary Baseline Revisions in accordance with MODIS-N Software Management Requirements (422-20-04) Table 4-1	5 5 5	C C C	R A A CH-03

Part B. DOCUMENTATION LISTING (CONTINUED)5. MISCELLANEOUS (5XX SERIES)

<u>NO.</u>	<u>DOCUMENT</u>	<u>DUE DATE, MATURITY</u>	<u>QTY.</u>	<u>DIST.</u>	<u>SUB CAT</u>
501	Audit Program Description	Proposal, Final Updates with PAIP, Final	A A	A A	I I
502	RESERVED/DELETED				CH-01
503	Weight and Power Budgets	Monthly, Current	5	C	I
504	Limited Life Items List	30 days prior to PDR, Prelim 30 days prior to CDR, Final Updates per CCR, Final	5 5 5	C C C	R R R
505	Nonstandard Parts Data Package	30 days prior to procurement, Final 30 days prior to use (if in stock), Final	5 5	C C	A A
506	Material List, Lubrication List, and Processes List	30 days prior to PDR, Prelim 30 days prior to CDR, Final Updates per CCR, Final	5 5 5	C C C	R A A
507	Critical Items List (CIL)	30 days prior to PDR, Prelim 30 days prior to CDR, Final Class I change submittal, Final	5 5 5	C C C	R R R
508	Acquisition Activities Plan	Proposal, Prelim SSR, Final SWPDR, Rev	A 5 5	A C C	R CH-03 A A
509	Approved or Controlled Drawings	Update As Generated, Final	2	C	I CH-06
510	Material Review Board Waiver/ Deviation Requests	As Generated, Final	5	C	A
511	Safety Waiver Requests	As Generated, Final	5	C	A
512	Configuration Change Requests (CCR) Class I	As Generated, Final	5	C	A
513	Configuration Change Requests (CCR) Class II	As Generated, Final	5	C	R
514	Software Discrepancy Reports	As Generated, Final	5	C	R
515	Drawing Tree	Update As Generated, Final	5	C	I
516	Instrument Interface Description Document	SSR, Prelim PDR, Final	5 5	C C	I I
517	Drawing Books	Update As Generated, Final	5	C	I
518	Indentured Drawing List	With PFM delivery, Final With FMs (if modified), Final	5 5	C C	I I
519	MODIS-N Technical Description Document	PDR, Prelim End of EM Tests, Final	5 75	C C	R R

Part B. DOCUMENTATION LISTING (CONTINUED)5. MISCELLANEOUS (5XX SERIES) - Cont'd

<u>NO.</u>	<u>DOCUMENT</u>	<u>DUE DATE, MATURITY</u>	<u>QTY.</u>	<u>DIST.</u>	<u>SUB CAT</u>
520	RESERVED				
521	Weekly Status Reports	Weekly, Current	1	•	I
522	Photographic Records	As Generated, Final	See CDRL	**	I
523	Performance Measurement Status Report	Monthly, Final	B	B	I
524	Material Usage Agreement/ Stress Corrosion Evaluation	Update As Generated, Final	5	C	A
525	As-Built Materials List	With end-item Acceptance Data Package, Final	5	C	A CH-04
526	Acceptance Data Package	End-item delivery, Final	15	C	A
527	As-Designed Parts List	90 days after proposal, Prelim	5	C	I
		30 days prior to PDR, Rev	5	C	I
		30 days prior to CDR, Rev	5	C	I
		Update As Generated, Final	5	C	I
528	As-Built Parts List	With end item Acceptance Data Package, Final	5	C	I CH-04
529	Reports of Work	As Generated, Final	5	C	I
530	Material Inspection and Receiving Report	As Generated, Final	B	B	I
531	DOD Industrial Plant Equipment Requisition (DD Form 1419)	As Generated, Final	B	B	A
532	DOD Property Record (DD1342)	As Generated, Final	B	B	I
533	Annual Report of Government Owned/Contractor-Held Property	As Generated, Final	B	B	I
534	Monthly and Quarterly Financial Management Report (NASA Form 533M/533Q)	As Generated, Final	B	B	I
535	Subcontracting Report (Standard Form 294)	As Generated, Final	B	B	I
536	Summary Subcontracting Report (Standard Form 295)	As Generated, Final	B	B	I
537	Report on NASA Subcontracts (NASA Form 667)	As Generated, Final	B	B	I
538	Intermediate Logic Network Diagrams	Monthly, Current	5	C	R CH-04

Part B. DOCUMENTATION LISTING (CONTINUED)5. MISCELLANEOUS (5XX SERIES) - Cont'd

<u>NO.</u>	<u>DOCUMENT</u>	<u>DUE DATE, MATURITY</u>	<u>QTY.</u>	<u>DIST.</u>	<u>SUB CAT</u>	
539	Intermediate Bar Charts	Monthly, Current	3	C	R	
540	Tabular Reports	Monthly, Current	3	C	R	
541	Work Packages/Scheduling System Cross Ref. Guide	Quarterly, Current	3	C	R	CH-04
542	End Item Float Report	Monthly, Current	3	C	R	
543	Monthly Analysis	Monthly, Current	3	C	R	

* Sent directly to Technical Officer; hard copy to follow via letter
 ** Sent directly to Technical Officer

PART C. DOCUMENTATION DESCRIPTION**Summary List:**

CDRL NO.	<u>Document</u>	
526	Acceptance Data Package	
508	Acquisition Activities Plan	CH-03
212	Alerts	
533	Annual Report of Government-Owned/Contractor-Held Property	
509	Approved or Controlled Drawings	
525	As-Built Materials List	
528	As-Built Parts List	
527	As-Designed Parts List	
413	Assembly Procedures	
501	Audit Program Description	
205	Audit Reports	
018	Calibration Management Plan	
019	Calibration Peer Review (CPR) Data Package	
303	Command List and Description	
206	Component and Subassembly Test Reports for Subcontracted Items	
512	Configuration Change Requests (CCR), Class I	
513	Configuration Change Requests (CCR), Class II	
005	Configuration Management Plan	
203	Configuration Management Status Report	
007	Contamination Control Plan	
105	Contractor-Generated Internal Technical Memoranda	

PART C DOCUMENTATION DESCRIPTION (CONTINUED)

CDRL NO.	<u>Document</u>	
408	Control of Unscheduled Activities (Integration/Verification Testing)	
507	Critical Items List (CIL)	
218	Data on Non-Conventional Application of Materials	
202	Data on Uncured, Out-of-Date Materials	
410	Detailed Ground Calibration Procedures	
004	Detailed Schedules	
409	Detailed Test Procedures	
502	RESERVED/DELETED	CH-01
531	DOD Industrial Plant Equipment Requisition (DD Form 1419)	
532	DOD Property Record (DD 1342)	
403	DPA Procedures	
517	Drawing Books	
515	Drawing Tree	
027	EM Test Review Data Package	
542	End Item Float Report	CH-04
104	Engineering Analyses Reports	
304	Engineering Drawings for Materials Applications	
305	Engineering Telemetry Description	
207	Engineering Test Reports	
023	Fabrication and Assembly Flow Plan	
108	Failure Modes and Effects Analysis (FMEA)	
226	Final Report-Design Through Flight Evaluation	

PART C DOCUMENTATION DESCRIPTION (CONTINUED)

CDRL NO.	<u>Document</u>	
405	General Operating Command Procedures	
411	GSE Test Procedures	
106	Hazard Analyses	
216	Hazard Control Verification Report	
025	In-Flight Checkout Plan	
518	Indentured Drawing List	
302	Instrument Functional Logic Diagrams	
516	Instrument Interface Description Document	
219	Instrument Output Data Records Required in Special Data Requirements Section of the MODIS-N Specification	
539	Intermediate Bar Charts	CH-04
538	Intermediate Logic Network Diagrams	CH-04
034	Launch Complex Safety Plan	
037	Level 1 Master Schedule	CH-04
504	Limited Life Items List	
010	Make or Buy Plan	
209	Malfunction/Failure Reports	
001	Management Plan	
530	Material Inspection and Receiving Report	
510	Material Review Board Waiver/Deviation Requests	
524	Material Usage Agreement/Stress Corrosion Evaluation	
506	Materials Lists, Lubrication List, and Processes Lists	
519	MODIS-N Technical Description Document	

PART C DOCUMENTATION DESCRIPTION (CONTINUED)

CDRL NO.	<u>Document</u>	
543	Monthly Schedule Variance Analysis	CH-04
534	Monthly and Quarterly Financial Management Report (NASA Form 533M/533Q)	
210	MRB Decisions on Non-Conformance	
011	New Technology Reporting Plan	
223	New Technology Reports	
039	Non-Ionizing Radiation Source Usage Plan	CH-04
505	Nonstandard Parts Data Package	
307	Operation and Maintenance Manuals	
404	Operational In-Flight Calibration Procedures	
107	Operations Hazards Analyses	
220	Other Technical Reports and Reissued Reports	
109	Parts and Devices Stress Analyses	
006	Performance Assurance Implementation Plan (PAIP)	
204	Performance Assurance Status Report	
523	Performance Measurement Status Report	
003	Performance Measurement System Implementation Plan and System Description	
022	Performance Verification Plan	
412	Performance Verification Procedures	
208	Performance Verification Reports	
308	Performance Verification Specification	
522	Photographic Records	

PART C DOCUMENTATION DESCRIPTION (CONTINUED)**CDRL****NO. Document**

030	Post-Environmental Review (POER) Data Package	
029	Pre-Environmental Review (PRER) Data Package	
032	Pre-Ship Review (PSR) Data Package	
031	Pre-Storage Review Data Package	
016	Preliminary Design Review (PDR) Data Package	
201	Previously Designed, Fabricated or Flown Hardware Data	
211	Problem and Failure Report Close-out	
002	Project Organization Chart	
101	Radiometric Math Model	
110	Reliability Assessment	
537	Report on NASA Subcontracts (NASA Form 667)	
529	Reports of Work	
520	Reserved	
213	Responses to Alerts	
225	Responses to Formal Actions	
214	Responses to NASA Problem Notices	
038	Rolling Wave Schedule	CH-04
013	Safety and Health Plan	
224	Safety Compliance Data Package	
511	Safety Waiver Requests	
036	Schedule Management Plan	CH-04
012	Small Business and Small Disadvantaged Business Concerns Subcontracting Plan	

PART C DOCUMENTATION DESCRIPTION (CONTINUED)

CDRL NO.	<u>Document</u>	
028	Software Acceptance Review (SWAR) Data Package	
309	Software Assurance Specifications	
021	Software Critical Design Review (SWCDR) Data Package	
514	Software Discrepancy Reports	
008	Software Management Plan	
017	Software Preliminary Design Review (SWPDR) Data Package	
306	Software Product Specifications	
040	Software Requirement Review (SWRR) Data Package	CH-04
402	Software Standards and Procedures	
033	Software Test Plan	
415	Software Test Procedures	
026	Software Test Readiness Review (SWTRR) Data Package	
217	Software Test Reports	
035	Spares Program Plan	
222	Specification Compliance and Calibration Data Books	
301	Specifications on parts, materials, subassemblies/Subsystems	
401	Standard Practices and Procedures	
414	Standard Repair Procedures	
024	Storage and Storage Testing Plan	
407	Storage Testing Procedures	
221	Storage Testing Reports	
113	Stress Analysis Report	CH-04

PART C DOCUMENTATION DESCRIPTION (CONTINUED)

CDRL NO.	<u>Document</u>	
102	Structural Math Model	
535	Subcontracting Reports (Standard Form 294)	
536	Summary Subcontracting Report (Standard Form 295)	
009	Sustaining Engineering and Operations Plan	
014	System Study Review (SSR) Data Package	
540	Tabular Reports	CH-04
103	Thermal Math Model	
406	Transportation and Handling Procedures	
111	Trend Analyses (List of Parameters to be Monitored)	
215	Trend Analysis Reports (Monitoring of Selected Parameters)	
015	Updated WBS Diagram and Task Description	
521	Weekly Status Reports	
503	Weight and Power Budgets	
541	Work Packages/Scheduling System Cross Reference Guide	CH-04
112	Worst Case Analyses	

DESCRIPTION OF REQUIRED DATA

1. Title:

MANAGEMENT PLAN

2. CDRL No.:

001

3. Reference:

Statement of Work (422-20-03), Para. I, II
 Work Breakdown Structure (422-20-01)

4. Use:

Describes how the project is organized and managed. It provides the management structure, its system of operation, responsible lines of communications, and key personnel assignments.

5. Related Documents:

CDRL #002-006, 008, 015, 036, 037, 203-205, 501, 523, 533, 538, 539, 543

| CH-04

6. Preparation Information:**PROGRAM MANAGEMENT**

This plan shall address the overall organization, management approach, and structure of the MODIS-N Program plus its interrelationships with the parent company and the subcontractors.

Describe how and where the program will operate during all phases of the contract. Delineate how the requirements of the Statement of Work (SOW) [422-20-03] will be achieved and include, as a minimum, a description of planned activities for identifiable SOW requirements.

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 and with any GFE suppliers. Indicate such things as critical paths, long-lead items and significant milestones down to at least the lowest level of the WBS (422-20-01). Show how this effort will be undertaken in view of the fact that

CDRL NO. 001 (CONTINUED)

spacecraft interfaces have not been fully defined. Indicate your needs for **additional definition** of spacecraft and mission, and when this information is **required to avoid schedule slippage**. Address the flexibility of the proposed system for accepting mission dictated changes, such as number or locations of bands, and when such changes must be defined in order to prevent major redesign of any instrument subsystem.

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

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 your MODIS-N Program Manager relative to other ongoing programs and applicable support organizations within the company structure. Discuss the program 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 program manager over interdepartmental work.

Process to be followed by the program manager in obtaining decisions beyond his/her authority and in resolving priority conflicts for resources and functions not under the program 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 program 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 MODIS-N Performance Assurance organizational structure, including staffing plans, reporting channels, authority and responsibilities, and management visibility. Discuss whether the technical, test, manufacturing and System Safety/Quality

CDRL NO. 001 (CONTINUED)

Assurance/Reliability/Configuration Management personnel required for this program (as indicated in your proposed labor hours) are presently on your payroll and immediately available for this work. State the number and kind of persons who would have to be hired, and plans to obtain them.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
PROJECT ORGANIZATION CHART	002

3. Reference:
 Statement of Work (422-20-03), Para. I, II
 Work Breakdown Structure (422-20-01)

4. Use:
 Identifies the contractors MODIS-N project organization with names, functions, lines of authority, coordination, etc.

5. Related Documents:
 CDRL #001, 003, 015

| CH-04

6. Preparation Information:
 As required in Management Plan. Update for the Preliminary Design Review (PDR) and as changed thereafter.
 This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

PERFORMANCE MEASUREMENT SYSTEM
IMPLEMENTATION PLAN AND SYSTEM DESCRIPTION

2. CDRL No.:

003

3. Reference:

Contract Clause H4
RFP Section L.3

4. Use:

To indicate cost/schedule performance.

5. Related Documents:

CDRL #001, 002, 004, 015, 036, 037, 502, 523, 538, 539, 543

| CH-04

6. Preparation Information:

This shall be prepared in accordance with Section L.3 of the RFP.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

DETAILED SCHEDULES

2. CDRL No.:004

3. Reference:

Statement of Work (422-20-03), Para. I, II, and 1 thru 12
 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
 4.2.4

4. Use:

For understanding and mapping out in detail the most efficient way of
 melding together all of the design, test, hardware and software elements for
 providing the flight equipment, GSE, S/C integration, data analyses and
 support functions, and documentation at the required program delivery
 times.

5. Related Documents:

CDRL #001, 003, 008, 014, 015, 036-038, 502, 523, 538, 539, 541, 543

| CH-04

6. Preparation Information:

The schedule for the design phase, through the Critical Design Review
 (CDR), shall be detailed by task with expected start and completion dates.
 The schedule for the procurement phase shall be detailed by major items,
 components, or definable subassembly, such as telescope, optical
 elements, scan mechanism, etc., and by class. This latter element shall be
 subdivided into standard electrical components, integrated circuits, etc.

The **schedule** for the fabrication phase shall be detailed to the mechanical
subassembly level and to the electronic board level, and shall show the
 expected start and completion dates, as well as substantive in-process
 milestones.

These schedules shall be presented by a flow type PERT diagram, and by
 Gantt schedule milestone charts. The preliminary PERT diagram submitted
 with the proposal shall contain a minimum of 200 events.

CDRL NO. 004 (CONTINUED)

Once the final design has been established a critical subsystem and parts list shall be compiled which shall show the date all parts or components were ordered and promised delivery dates.

For the build-up of an instrument, an assembly/test flow diagram shall be generated to show sequences of fabrication, assembly, integration, and test for components, subsystems and system, and includes quality assurance test points and associated inspection level requirements.

| CH-04

This schedule plan and the corresponding schedules shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

CONFIGURATION MANAGEMENT PLAN

2. CDRL No.:005

3. References:

EOS Configuration Management Plan (420-02-02), Para. 1.2, 1.3
 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
 Table 4-1

4. Use:

Defines a configuration management system which conforms to the EOS Configuration Management Plan (420-02-02) and provides a means of control for all changes affecting form, fit, or function and any impact on performance, cost, or schedule.

5. Related Documents:

CDRL #001, 006, 008, 035, 203, 510-513

| CH-04

6. 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 EOS configuration management requirements including the NASA Configuration Management Plan. The plan shall at least be written to conform to the EOS Configuration Management Plan (420-02-02).

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

<u>1. Title:</u>	<u>2. CDRL No.:</u>
PERFORMANCE ASSURANCE IMPLEMENTATION PLAN (PAIP)	006

3. References:

EOS Performance Assurance Requirements (420-05-01), Para. 1.3
 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
 Table 4-1
 EOS General Instrument Interface Specification (420-03-02), Section 9

| CH-07

4. Use:

Describes the contractor's system for accomplishing the assurance activities and compliance with performance assurance requirements.

5. Related Documents:

CDRL #001, 005, 007, 018, 022-024, 033, 035, 106-109, 111, 201, 202, 204,
 205, 208-218, 308, 309, 401-403, 406, 408, 412, 415, 501, 502, 504-507,
 510, 511, 526-528

| CH-04

6. Preparation Information:

The Performance Assurance Implementation Plan (PAIP) shall describe specifically and in detail how the requirements stated in the EOS PAR (420-05-01) are to be accomplished. In addition, the plan shall also include:

- a. Organization chart and defined responsibilities
- b. Matrix of the requirements, referencing the applicable paragraph numbers in the plan versus subsidiary plans and the implementation procedures, instructions, and specifications
- c. A list of assurance services that are to be procured, identifying the proposed subcontractor

CDRL NO. 006 (CONTINUED)

- d. **Copies** of practices, procedures, and instructions references in the plan **and not otherwise** required as deliverable documentation
- e. Audit program
- f. Procedures for control of unscheduled activities during integration and verification testing
- g. Contractor's derating policy
- h. Frequency of surveillance inspection
- i. Procedures for controlling Electrostatic Discharge (ESD)
- j. Parts control plan

This shall be prepared in accordance with the EOS PAR (420-05-01).

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

CONTAMINATION CONTROL PLAN

2. CDRL No.:

007

3. References:

EOS Performance Assurance Requirements (420-05-01), Para. 9.2
 EOS General Instrument Interface Specification (420-03-02), Section 8

| CH-07

4. Use:

Provide an integrated contamination control plan:

- a. To define level of cleanliness and methods/procedures to be followed to achieve adequate cleanliness/contamination control
 - b. To define the approach required to maintain cleanliness/contamination control through shipping, observatory integration test, and flight
-

5. Related Documents:

CDRL #006, 016, 020, 024, 029-032, 034, 035, 216, 221, 308, 406, 407, 412
 MODIS-N Unique Instrument Interface Document

6. Preparation Information:

A. Pre-flight:

- 1. Define the methods, procedures, and schedule requirements for integrating observatory instruments contamination control requirements in this control plan.
- 2. Define methods for determining a budget for allowable accretions for each phase of the program.
- 3. Define levels of cleanliness and methods/procedures to be followed for this Project, from start of contract to end of mission, referencing all analyses to get performed to assess instrument sensitivity and to define requirements. Show that these methods/procedures are in consonance with the EOS GIIS (420-03-02) and the MODIS-N UIID requirements.

CDRL NO. 007 (CONTINUED)

4. Identify critical fabrication and assembly activities which will be performed in clean rooms or in clean room benches at the 100,000 or 10,000 class level or NHB 5340.2. Provide an integrated operations flow chart. | CH-04
5. Identify the controls over atmospheric contaminants, temperature, and humidity which will be used during electronic fabrication (including soldering) integration, testing, transportation, and launch. Indicate how others controls will meet the requirements, including a description of all facilities that will be used.
6. Identify cleaning, inspection, and bagging to be used for parts, flight subassemblies, and the assembled instrument. Identify how other activities will meet the requirements, and reference the procedures used for these activities. | CH-06
7. Identify design features of shipping containers which will keep contamination on flight hardware during shipping and storage within the contamination budget.
8. Define the requirements and methods/procedures required to maintain cleanliness during spacecraft and laboratory fabrication, integration, and test.
9. Show that the efforts to control contamination are consistent with controls to prevent electrostatic damage.
10. Indicate the methods and frequency for monitoring cleanliness levels and accretions to ensure compliance with requirements.
11. Define criteria for materials selection and acceptance relative to contamination control.
12. Specify criteria for bake-out of critical subsystems.
13. Provide a contamination training program. All personnel required to work in clean areas with flight hardware must be trained to work according to clean area procedures.
14. Define overall vent location and orientation policy, indicating how unintentional venting shall be avoided. (All applicable drawings should show vent locations that comply with venting analysis.)

CDRL NO. 007 (CONTINUED)

B. Flight

1. **Define** the design requirements and design approach for contamination control for launch operation through mission.

This shall be prepared in accordance with the EOS PAR (420-05-01).

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
SOFTWARE MANAGEMENT PLAN	008

3. References:

MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
Table 4-1

4. Use:

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

5. Related Documents:

CDRL #001, 004, 005, 009, 017, 021, 026, 028, 033, 036, 037, 040, 108,
217, 306, 309, 402, 415, 508, 514, 538, 539

| CH-04

6. Preparation Information:

This shall apply to all of the software provided by the MODIS-N contractor for the EOS Program, including on-board software used to conduct system testing. Software that is institutional and multiuser, of 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.

This shall be prepared in accordance with the requirements defined in NASA-DID-M000, "Software Management Plan", and the MODIS-N Software Management Requirements (422-20-04).

| CH-03

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:SUSTAINING ENGINEERING AND
OPERATIONS PLAN**2. CDRL No.:**009

3. References:MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
4.8, Table 4-1

4. Use:Defines the process by which the contractor plans to maintain, process
change requests, and operate the MODIS-N software system.

5. Related Documents:

CDRL #008, 017, 021, 026, 028, 307, 508

| CH-04

6. Preparation Information:This shall be prepared in accordance with NASA-DID-M300, "Sustaining
Engineering and Operations Activities Plan" and the MODIS-N Software
Management Requirements (422-20-04).

| CH-03

This shall be submitted in accordance with Part B (0XX Series) of this
document.

DESCRIPTION OF REQUIRED DATA

1. Title:

MAKE OR BUY PLAN

2. CDRL No.:

010

3. References:

Contract Clause G.11, 18-52.215-78
EOS Configuration Management Plan (420-02-02), Figure 3-1

4. Use:

Defines the contractor program which identifies whether contractor will either "make" or "buy" major subsystems, assemblies and components.

5. Related Documents:

CDRL #023

6. Preparation Information:

Submit with proposal in accordance with 18-52.215-78 (See Section L) and in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

NEW TECHNOLOGY REPORTING PLAN

2. CDRL No.:

011

3. Reference:Contract Clause G.7
NFS 18-52-227-70

4. Use:

Defines contractor plan for reporting new technology to the government in accordance with provisions and the requirements set forth in the contract schedule clauses for new technology.

5. Related Documents:

CDRL #535, 536

| CH-04

6. Preparation Information:

Prepare in accordance with NFS 18-52-227-70 and NFS 18-52-235-72.

Submit in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

SMALL BUSINESS AND SMALL
DISADVANTAGED BUSINESS CONCERNS
SUBCONTRACTING PLAN

2. CDRL No.:

012

3. Reference:

Contract Clause H.7
Contract Clause I.1

4. Use:

Provide contractor plan for subcontracting to small business concerns.

5. Related Documents:

None

6. Preparation Information:

Prepare in accordance with Clause H.7 and FAR Clause 52.219-9.

Submit in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

SAFETY AND HEALTH PLAN

2. CDRL No.:013

3. Reference:Contract Clause H.8

4. Use:

Defines contractor's plan to comply with safety and health provisions of the contract schedule clauses.

5. Related Documents:CDRL #224

6. Preparation Information:

Provide a detailed plan and implementation schedule that shows how the contractor shall ensure compliance with all safety and health provisions required by the contract.

This plan does not include systems safety activities.

This shall be submitted in accordance with Part B (OXX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
SYSTEM STUDY REVIEW (SSR) DATA PACKAGE	014

3. Reference:

Statement of Work (422-20-03), Para. 0
 MODIS-N Specification (422-20-02)
 EOS Configuration Management Plan (420-02-02), Figure 3-1
 EOS Performance Assurance Requirements (420-05-01), Para. 2.2

4. Use:

To define derived requirements for satisfying the instrument specification, to analyze the conceptual design, to perform tradeoffs, and to determine system margins for instrument requirements such as sensitivity, polarization, stability, calibration, and to review programmatic plans leading to the Preliminary Design Review.

5. Related Documents:

CDRL #004, 016, 017, 019-021, 026, 028-032, 036, 037, 040, 104-107, 111, 215, 216, 225, 538, 539

CH-04

6. Preparation Information:

The design review package shall be prepared in accordance with the EOS PAR (420-05-01) and shall include, as a minimum:

- a. **Agenda**
- b. **Copies** of responses to action items and recommendations generated **at prior reviews**
- c. Presentation material (e.g., viewgraph copies) for the subject review
- d. Analysis and reports required at the review
- e. Supportive material. Where supportive material has been submitted prior to or concurrent with this requirement, such material may be incorporated within this requirement by reference

CDRL NO. 014 (CONTINUED)

- f. **EOS** system definition, analysis, and specification
- g. Instrument definition, analysis, and specification
- h. Interaction of major elements of the instrument
- i. Design approaches and operational concepts

The minutes and results of this review, with action items and responses (CDRL #225), shall also be submitted.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
UPDATED WBS DIAGRAM AND TASK DESCRIPTION	015

3. Reference:

Statement of Work (422-20-03), Para. 0, and 1
MODIS-N Specification (422-20-02)

4. Use:

For identification of MODIS-N program tasks and any changes to WBS.

5. Related Documents:

CDRL #001-004, 016, 017, 020, 036, 037, 538, 539, 541, 543

| CH-04

6. Preparation Information:

For accepted changes to the WBS structure, the contractor shall document the changes with an updated WBS diagram and description of task elements.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:PRELIMINARY DESIGN REVIEW (PDR)
DATA PACKAGE**2. CDRL No.:**016

3. Reference:Statement of Work (422-20-03), Para. 1
MODIS-N Specification (422-20-02)
EOS Performance Assurance Requirements (420-05-01), Para. 2.2 , 2.5
EOS Configuration Management Plan (420-02-02), Figure 3-1| CH-04

4. Use:Presents the Flight Equipment and GSE design and operation and S/C
interface aspects prior to EM Fabrication.

5. Related Documents:CDRL #007, 014, 015, 017-023, 025-032, 035, 040, 101-109, 111, 112, 201,
207, 215, 216, 224, 225, 301-303, 305, 308, 404, 405, 503, 504, 506, 507,
509-511, 515-518, 527
EOS Calibration Management Plan (420-03-01)| CH-04

6. Preparation Information:The design review package shall be prepared in accordance with the EOS
PAR (420-05-01), and shall include, as a minimum:

- a. Agenda
- b. **Copies** of responses to action items and recommendations generated
at prior reviews
- c. Presentation material (e.g., viewgraph copies) for the subject review
- d. Analyses and reports required at the review
- e. Supportive material. Where supportive material has been submitted
prior to or concurrent with this requirement, such material may be
incorporated within this requirement by reference.

CDRL NO. 016 (CONTINUED)

This **data package** shall also contain information to cover the instrument system **and** subsystem designs, and GSE, including electrical, mechanical, optical, **thermal**, software, test and interface aspects of the design configuration. This data package shall include, as applicable:

- a. Performance Specification (subsystems and GSE)
- b. Block Diagram and Description of Operation (instrument and GSE)
- c. Schematic and Logic Diagrams (including waveforms, timing, and components)
- d. Mechanical Configuration Drawings
- e. Interface Descriptions
- f. FMEA status/results
- g. Worst Case Analyses
 - Electrical Circuits
 - Scanning Drive System
 - Lubrication and Lubrication Loss
 - Tolerance and Tolerance Sensitivity Analysis (including thermal, optical, and mechanical considerations)
- h. Stress Analyses using NASTRAN with hand verification
- i. Thermal Analysis
 - Detectors
 - Scanning Drive System
 - Electronics
 - Scanner Unit
 - In-flight calibrators
- j. RFI Considerations
- k. **Weight** and Power
- l. Reliability Analysis/Assessment
- m. Test Plan (including all Environmental Tests)
- n. Manufacturing Considerations
- o. Maintainability Considerations

CDRL NO. 016 (CONTINUED)

- p. **Materials** and Processes Lists
- q. **Summary of Deviations/Waivers**
- r. Contamination Control and Monitoring Considerations
- s. Spares Program
- t. Safety Compliance Data Package
- u. NASPAR Summary (number submitted/approval status)
- v. System Safety Hazards Analyses
 - Hazards Identification Matrix
 - Single Point Failure Summaries
 - Risk Assessment Rationale
- w. Simulation/Prototyping for software

| CH-04

The minutes and results of this review, with action items and responses, (CDRL #225) shall also be submitted.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:SOFTWARE PRELIMINARY DESIGN REVIEW
(SWPDR) DATA PACKAGE**2. CDRL No.:**

017

3. Reference:Statement of Work (422-20-03), Para. 1
MODIS-N Specification (422-20-02)
MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3
EOS Configuration Management Plan (420-02-02), Figure 3-1

4. Use:Presents the preliminary software/firmware design and operation aspects
prior to EM Fabrication.

5. Related Documents:CDRL #008, 009, 014-016, 020-021, 024-026, 028, 032-033, 040, 104, 225,
303, 306, 309, 415, 508

| CH-04

6. Preparation Information:

This design review package shall address, as a minimum:

- a. Agenda
- b. Copies of responses to action items and recommendations generated at prior reviews
- c. **P**resentation material (e.g., viewgraph copies) for the subject review
- d. **A**nalyses and reports required at the review
- e. Supportive material. Where supportive material has been submitted prior to or concurrent with this requirement, such material may be incorporated within this requirement by reference.
- f. Software documentation in compliance with the MODIS-N Software Management Requirements (422-20-04)

CDRL NO. 017 (CONTINUED)

- g. **Software**, both instrument-based and external, necessary to operate, test, calibrate, design, and analyze the instrument
- h. Compatibility of MODIS-N software with the spacecraft (S/C), and for operation and calibration through EOSDIS
- i. Software necessary to analyze MODIS-N test data and for in-flight engineering analysis
- j. Software capability to provide all MODIS-N operational modes
- k. Software required for operations analyses utilizing the the System Test Equipment (STE)
- l. Software for supporting instrument verification, integration, monitoring of performance, ground operations, as well as supporting evaluation of data acquired during S/C integration and flight operations
- m. Software for meeting MODIS-N Limits Program requirements
- n. Providing and maintaining realtime and off-line software for instrument calibration including complete wavelength
- o. Calibration in all spectral bands
- p. Software for a formatted realtime data dump
- q. Software test plan

The minutes and results of this review, with action items and responses, (CDRL #225) shall also be submitted.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

CALIBRATION MANAGEMENT PLAN

2. CDRL No.:018

3. Reference:

Statement of Work (422-20-03), Para. 2, 3, 4, 9, and 12
 MODIS-N Specification (422-20-02)
 EOS Calibration Management Plan (420-03-01), Para. 3, 3.2

4. Use:

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

5. Related Documents:

CDRL #006, 016, 019, 022, 025, 029, 030, 035, 101, 222, 404, 410

| CH-04

6. Preparation Information:

This shall be prepared in accordance with the EOS Calibration Management
 Plan (420-03-01).

This shall be submitted in accordance with Part B (0XX Series) of this
 document.

DESCRIPTION OF REQUIRED DATA

-
1. Title: CALIBRATION PEER REVIEW (CPR) DATA PACKAGE
2. CDRL No.: 019
-
3. Reference:
- Statement of Work (422-2-03), Para. III G, J, and M
 MODIS-N Specification (422-20-02), Para. 5
 EOS Calibration Management Plan (420-03-01), Para. 3, 3.4
-
4. Use:
- For providing detailed calibration information to the Calibration Peer Review team members prior to the Peer Review.
-
5. Related Documents:
- CDRL #014, 016, 018, 020, 029, 030, 032, 104, 222, 225, 404, 410
-
6. Preparation Information:
- Documentation shall be provided for each of the three Calibration Peer Reviews. For Peer Review 1, a detailed calibration scenario shall be provided. It shall, as a minimum, include planned calibration equipment and facilities. It shall also address calibration accuracies.
- Peer Review 2 documentation shall contain an update to the first calibration peer review. It shall include a top-level discussion of calibration management and procedures, as well as a detailed update on calibration sources and accuracies.
- Peer Review 3 documentation shall be an update to the previous calibration peer reviews. It shall include reporting on the experience of the calibration of the Engineering Model (EM). It shall address EM calibration accuracies achieved, with justification for these claimed accuracies, and plans for improvement if necessary, to meet calibration specifications for calibration of the subsequent MODIS-N models.
- Documentation shall be submitted in accordance with Part B (0XX Series) of this document.

| CH-04

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
CRITICAL DESIGN REVIEW (CDR) DATA PACKAGE	020

3. Reference:

Statement of Work (422-20-03), Para. 1
 MODIS-N Specification (422-20-02)
 EOS Configuration Management Plan (420-02-02), Figure 3-1
 EOS Performance Assurance Requirements (420-05-01), Para. 2.2, 2.5

| CH-04

4. Use:

Presents the Flight Equipment and GSE design and operation and S/C interface aspects as evaluated since the PDR and prior to major flight model parts ordering.

5. Related Documents:

CDRL #007, 014-017, 019, 021-030, 032, 035, 040, 101-106, 108-112, 201, 206, 207, 215, 216, 220, 225, 302, 305, 308, 406-408, 504, 506, 507, 509, 515-518, 527
 EOS Calibration Management Plan (420-03-01)

| CH-04

6. Preparation Information:

The design review package shall be prepared in accordance with the EOS PAR (420-05-01), and shall include, as a minimum:

- a. Agenda
- b. **Copies** of responses to action items and recommendations generated at **prior reviews**
- c. Presentation material (e.g., viewgraph copies) for the subject review
- d. Analyses and reports required at the review
- e. Supportive material. Where supportive material has been submitted prior to or concurrent with this requirement, such material may be incorporated within this requirement by reference.

CDRL NO. 020 (CONTINUED)

- f. **Updates** of items required from PDR
- g. **Component specifications, designs, schematics, and diagrams**
- h. Design adequacy data (drawings, analyses, and testing plans)
- i. Parts and devices application review reports
- j. Worst-case analysis
- k. FMEA
- l. Breadboard, component, and EM subsystem functional test results
- m. Critical Items List (CIL)
- n. Single point failure summaries with risk acceptance rationale
- o. Actions to control or eliminate identified system safety hazards
- p. Simulation/Prototyping for Software

| CH-04

Items f. thru k. shall be included for a component level CDR with items l. thru p. included for a subsystem/higher assembly level CDR.

The minutes and results of this review with action items and responses (CDRL #225), shall also be submitted.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
SOFTWARE CRITICAL DESIGN REVIEW (SWCDR) DATA PACKAGE	021

3. Reference:

Statement of Work (422-20-03), Para. 1
 MODIS-N Specification (422-20-02)
 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3
 EOS Configuration Management Plan (420-02-02), Figure 3-1

4. Use:

Presents the software/firmware design and operation and interface aspects as evaluated since the PDR and prior to major flight model ordering and development.

5. Related Documents:

CDRL #008, 009, 014, 016, 017, 020, 026, 028, 033, 040, 207, 217, 220,
 225, 303, 306, 309, 415, 508, 514

| CH-04

6. Preparation Information:

This design review package shall address, as a minimum:

- a. Agenda
- b. Copies of responses to action items and recommendations generated at prior reviews
- c. Presentation material (e.g., viewgraph copies) for the subject review
- d. Analyses and reports required at the review
- e. Supportive material. Where supportive material has been submitted prior to or concurrent with this requirement, such material may be incorporated within this requirement by reference.

CDRL NO. 021 (CONTINUED)

- f. All documentation as called for in the MODIS-N Software Management Requirements (422-20-04)
- g. Updates of items required for SWPDR
- h. Software test plans and results

The minutes and results of this review with action items and responses (CDRL #225), shall also be submitted.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

PERFORMANCE VERIFICATION PLAN

2. CDRL No.:022

3. References:

EOS Configuration Management Plan (420-02-02), Figure 3-1
 EOS Performance Assurance Requirements (420-05-01), Para. 3.2.1, 3.6.2

4. Use:

Provide overall view of the MODIS-N Performance Verification and Test Program, detailing test philosophy objectives and rationale for all testing and integration activities planned for the program.

5. Related Documents:

CDRL #006, 016, 018, 020, 033, 106-112, 204, 208, 216, 217, 308, 406,
 412, 413, 415
 EOS General Instrument Interface Specification (420-03-02)
 MODIS-N Unique Instrument Interface Document

CH-04

6. Preparation Information:

This documentation shall incorporate the requirements of the EOS Mission System Description & Validation Approach and shall be developed in accordance with the EOS PAR (420-05-01). This shall be submitted in two sections:

Section I--Overall integration and test philosophy, objectives and rationale for the components, subsystem and observatory.

Section II--Overall integration and test philosophy, objectives and rationale for MODIS-N.

Each Section shall contain, as a minimum:

- a. Performance Verification Matrices which delineate performance and design requirements versus the assessment or test verification methods to prove compliance with the system specifications

CDRL NO. 022 (CONTINUED)

- b. **Identification of whether the verifications to be demonstrated by test are conducted on either test module or flight hardware/software**
- c. Those performance parameters utilized for the purpose of hardware and software verification
- d. Any and all development testing planned for the program that will be defined in the plan with objectives, levels, hardware status, software status, schedules, etc., shall be included
- e. Requirements for GSE, test equipment, and simulators to be used during testing
- f. Detailed flow chart showing correlated sequence of development and subsystem testing, including integration and qualification/acceptance activities for components, subsystem, observatory, instrument, and each laboratory. Show how these sequences interface with the launch site activities requirements
- g. Envelopes of environments and test levels for components, subsystems, spacecraft, and each laboratory
- h. Brief description of facility requirements such as thermal vacuum chamber interface, instrumentation, simulator methods, etc
- i. Descriptions of functional measurements planned at the component, subsystem, integration and system level., as well as descriptions of methods planned to make the measurements
- j. A component verification and status matrix showing the basis for providing and accepting the design and hardware/software on the basis of test and/or assessment
- k. Qualification and acceptance test plans with performance parameter **accept/reject criteria** for the instrument, subsystem, and component **level test parameters**
- l. **Description** of when and how frequently all redundant components and **cross-strapped paths** will be tested during each environmental test activity
- m. Post-Launch in-orbit verification test plan

CDRL NO. 022 (CONTINUED)

- n. **A list of performance parameters by subsystem shall be identified that will be used for monitoring stability data trends during the instrument qualification and acceptance test programs and during observatory testing and mission**
- o. **Plan for the verification of all previously flown and qualified hardware, including identification of additional verifications required**

The contractor shall provide plans to completely validate all instrument software for which the contractor is responsible. The preliminary version of this plan shall indicate best known requirements, test levels, etc. Unknown or uncertain elements and values shall be clearly indicated as "Final TBD," and the plan shall indicate how and when finalization is to occur.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

FABRICATION AND ASSEMBLY FLOW PLAN

2. CDRL No.:023

3. Reference:EOS Performance Assurance Requirements (420-05-01), Para. 8.10.1

4. Use:

Define the fabrication, assembly, inspection and test sequences, locations, operations and controls for hardware articles at all levels of assembly to be manufactured by the prime contractor on this contract.

5. Related Documents:CDRL #006, 010, 016, 020

6. Preparation Information:

Provide narrative material and flow charts which define the contractor's fabrication and assembly plan. This plan shall include, as a minimum:

- a. Description and the sequence of fabrication and assembly operations and processes
- b. Identification of the site(s) of the operation(s)
- c. Identification of tooling and facilities required
- d. **Description** of the cognizant organizational structure(s)
- e. **Requirements** for inspection and test stations
- f. Description of system of controls on fabrication and assembly, including documented procedures

CDRL NO. 023 (CONTINUED)

- g. **Integrated manufacturing and inspection flow chart which depicts all fabrication, processing and assembly operations; testing at the sub-component levels; associated inspection points and documentation. The sequence of this flow chart shall start with the point of entry of purchased materials, parts, components, or GFP and the initiation of manufacturing and conclusion with as assembled electrical or mechanical component being delivered for acceptance test, or an item of structure being delivered for integration**

This shall be prepared in accordance with the EOS PAR (420-05-01).

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>	
STORAGE AND STORAGE TESTING PLAN	024	
3. <u>Reference:</u>		
Statement of Work (422-20-03), Para. 2, 8, and 11 MODIS-N Specification (422-20-02) EOS Performance Assurance Requirements (420-05-01), Para. 8.15, 8.21		CH-04
4. <u>Use:</u>		
Define equipment, method, and procedures for flight equipment storage.		
5. <u>Related Documents:</u>		
CDRL #006, 007, 017, 020, 029-032, 034, 221, 406, 407, 409 EOS General Instrument Interface Specification (420-03-02)		CH-04
6. <u>Preparation Information:</u>		
This shall describe the storage means and facility environment, contamination control and monitoring, and storage testing.		
This shall be prepared in accordance with the EOS PAR (420-05-01).		
This shall be submitted in accordance with Part B (0XX Series) of this document.		

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
IN-FLIGHT CHECKOUT PLAN	025

3. Reference:

Statement of Work (422-20-03), Para. 2, 3, and 12
 MODIS-N Specification (422-20-02)

4. Use:

Define procedure to be followed per checking in-orbit performance of the
 MODIS-N instrument.

5. Related Documents:

CDRL #016-018, 020, 029, 030, 404, 405

| CH-04

6. Preparation Information:

This shall present the instrument operation modes with command sequences and telemetry readings for determining the in-orbit performance. Operation limits shall be identified for each operation made and troubleshooting sequences identified.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:SOFTWARE TEST READINESS REVIEW (SWTRR)
DATA PACKAGE**2. CDRL No.:**026

3. Reference:Statement of Work (422-20-03), Para. 1
MODIS-N Specification (422-20-02)
EOS Configuration Management Plan (420-02-02), Figure 3-1
MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3

4. Use:Presents the description and results for the S/W and System Integration/Test program.

5. Related Documents:CDRL #008, 009, 014, 016, 017, 020, 021, 028, 032, 040, 104, 217, 225,
303, 306, 309, 514| CH-04

6. Preparation Information:

This design review package shall address, as a minimum:

- a. Agenda
- b. Copies of responses to action items and recommendations generated at prior reviews
- c. **P**resentation material (e.g., viewgraph copies) for the subject review
- d. **A**nalyses and reports required at the review
- e. Supportive material. Where supportive material has been submitted prior to or concurrent with this requirement, such material may be incorporated within this requirement by reference.

CDRL NO. 026 (CONTINUED)

- f. **All documentation as called for in the MODIS-N Software Management Requirements (422-20-04).**
- g. **Test and Integration program descriptions and results**
- h. **Software test results**
- i. **Failure report summaries including status of action and rationale for closure**
- j. **As-built documentation summary**

The minutes and results of this review, with action items and responses (CDRL #225) shall also be submitted.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

EM TEST REVIEW DATA PACKAGE

2. CDRL No.:027

3. Reference:

Statement of Work (422-20-03), Part II, 1 thru 6; Part III, N
 MODIS-N Specification (422-20-02)
 EOS Configuration Management Plan (420-02-02), Figure 3-1

4. Use:

For review of EM test results and evaluation and comparison with
 MODIS-N program requirements.

5. Related Documents:

CDRL #016, 020, 029, 030, 032, 104, 203, 204, 207, 209, 211, 225

6. Preparation Information:

This test review package shall be prepared in accordance with the EOS PAR (420-05-01) and shall include, as a minimum:

- a. Agenda
- b. Copies of responses to action items and recommendations generated at prior reviews
- c. Presentation material (e.g., viewgraph copies) for the subject review
- d. **Analyses** and reports required at the review
- e. **Supportive material.** Where supportive material has been submitted prior to or concurrent with this requirement, such material may be incorporated within this requirement by reference.
- f. All test model, test components, and Engineering Model system and subsystem functional test and calibration results

CDRL NO. 027 (CONTINUED)

- g. **Comparison of measured performance with design specification requirements, design analysis results, and contract specifications**
- h. Information on malfunctions
- i. Completeness of drawings
- j. Problems and proposed solutions
- k. Status of performance assurance and configuration management activities, spacecraft interface, and schedule

It shall be held at the contractor's facility.

The minutes and results of this review, with action items and responses (CDRL #225), shall also be submitted.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:SOFTWARE ACCEPTANCE REVIEW (SWAR)
DATA PACKAGE**2. CDRL No.:**028

3. Reference:Statement of Work (422-20-03), Para. 1
MODIS-N Specification (422-20-02)
EOS Configuration Management Plan (420-02-02), Figure 3-1
MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3

4. UseFor review of all test data and designs for compliance against specification requirements, variances, mission operations requirements, etc.

5. Related Documents:CDRL #008, 009, 014, 016, 017, 020, 021, 026, 032, 040, 104, 207-209,
217, 220, 225, 303, 306, 309, 405, 514| CH-04

6. Preparation Information:

This data package shall address, as a minimum:

- a. Agenda
- b. Copies of responses to action items and recommendations generated at prior reviews
- c. Presentation material (e.g., viewgraph copies) for the subject review
- d. Analyses and reports required at the review
- e. Supportive material. Where supportive material has been submitted prior to or concurrent with this requirement, such material may be incorporated within this requirement by reference.
- f. Results of the functional and interface tests

CDRL NO. 028 (CONTINUED)

- g. **Malfunctions** and corrective actions
- h. **Reliability** predictions
- i. Comparison of measured performance with requirements and discussion of the effect of any variance and waivers
- j. Mission operation constraints
- k. Safety requirements
- l. Maintenance and operation manuals
- m. Interface concerns, problems and solutions.
- n. Compatibility of instrument with observatory flight support equipment, ground support equipment and operational ground equipment

The minutes and results of this review, with action items and responses (CDRL #225), shall also be submitted.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

<u>1. Title:</u>	<u>2. CDRL No.:</u>
PRE-ENVIRONMENTAL REVIEW (PRER) DATA PACKAGE	029

3. Reference:

Statement of Work (422-20-03), Section III, O
 MODIS-N Specification (422-20-02)
 EOS Configuration Management Plan (420-02-02), Figure 3-1
 EOS Performance Assurance Requirements (420-05-01), Para. 2.2

| CH-04

4. Use:

Presents the description and results for the Test and Calibration program.

5. Related Documents:

CDRL #007, 014, 016, 018-020, 024, 025, 027, 030-032, 104, 107, 207, 209,
 211, 225, 307, 409, 411, 503, 525, 528

| CH-04

6. Preparation Information:

This design review package shall be prepared in accordance with the EOS PAR (420-05-01) and shall include, as a minimum:

- a. Agenda
- b. Copies of responses to action items and recommendations generated at prior reviews
- c. **P**resentation material (e.g., viewgraph copies) for the subject review
- d. Analyses and reports required at the review
- e. Supportive material. Where supportive material has been submitted prior to or concurrent with this requirement, such material may be incorporated within this requirement by reference.

CDRL NO. 029 (CONTINUED)

- f. **Test and Integration** program descriptions and results
- g. **Failure** report summaries including status of action and rationale for closure
- h. As-built documentation summary

The minutes and results of this review, with action items and responses (CDRL #225) shall also be submitted.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

POST-ENVIRONMENTAL REVIEW (POER)
DATA PACKAGE

2. CDRL No.:

030

3. Reference:

Statement of Work (422-20-03), Para. 1
MODIS-N Specification (422-20-02)
EOS Configuration Management Plan (420-02-02), Figure 3-1
EOS Performance Assurance Requirements (420-05-01), Para. 2.2

4. Use:

Presents the test results of the Environmental Test program.

5. Related Documents:

CDRL #007, 014, 016, 018-020, 024, 025, 027, 029, 031, 032, 104, 107,
110, 207-209, 211, 225

6. Preparation Information:

This design review package shall be prepared in accordance with the EOS PAR (420-05-01) and shall include, as a minimum:

- a. Agenda
- b. Copies of responses to action items and recommendations generated at prior reviews
- c. **P**resentation material (e.g., viewgraph copies) for the subject review
- d. **A**nalyses and reports required at the review
- e. Supportive material. Where supportive material has been submitted prior to or concurrent with this requirement, such material may be incorporated within this requirement by reference (e.g., detailed test verification procedures).

CDRL NO. 030 (CONTINUED)

- f. **Results** of functional, environmental, and calibration tests. **History graphs** shall be provided to show all test point measured values taken prior to, during, and after environmental tests. In addition, signal channel bandwidth curves and sensitivity measurements shall be provided.
- g. Comparison of measured performance with requirements and discussion of the effect of any variance and waivers
- h. Malfunctions and corrective actions, including status of action and rationale for closure
- i. Reliability concerns and recommendations

The minutes and results of this review, with action items and responses (CDRL #225) shall also be submitted.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

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- | | |
|---------------------------------|---------------------|
| 1. <u>Title:</u> | 2. <u>CDRL No.:</u> |
| PRE-STORAGE REVIEW DATA PACKAGE | 031 |
-
3. Reference:
- Statement of Work (422-20-03), Para. 1
MODIS-N Specification (422-20-02)
-
4. Use
- For evaluation of storage procedures and facilities for compliance against specification requirements, variances, handling procedures, instrument handling, etc.
-
5. Related Documents:
- CDRL #007, 014, 016, 024, 029, 030, 032, 035, 104, 209, 211, 221, 225, 307, 406, 407
-
6. Preparation Information:
- This review package shall address, as a minimum:
- a. Agenda
 - b. Copies of responses to action items and recommendations generated at prior reviews
 - c. Presentation material (e.g., viewgraph copies) for the subject review
 - d. **Analyses** and reports required at the review
 - e. Supportive material. Where supportive material has been submitted prior to or concurrent with this requirement, such material may be incorporated within this requirement by reference.
 - f. Results of the functional and environmental tests
 - g. Malfunctions and corrective actions

CDRL NO. 031 (CONTINUED)

- h. **Contamination avoidance requirements**
- i. **Maintenance and operation manuals**
- j. **Review of instrument handling procedures**

The minutes and results of this review, with action items and responses (CDRL #225), shall also be submitted.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
PRE-SHIP REVIEW (PSR) DATA PACKAGE	032

3. Reference:

Statement of Work (422-20-03), Para. 1
 MODIS-N Specification (422-20-02)
 EOS Configuration Management Plan (420-02-02), Figure 3-1
 EOS Performance Assurance Requirements (420-05-01), Para. 2.2

4. Use

For review of all test data and designs for compliance against specification requirements, variances, mission operations requirements, etc.

5. Related Documents:

CDRL #007, 014, 016, 017, 019, 020, 024, 026-031, 034, 035, 104-112, 201, 206-217, 219-222, 224, 225, 301-303, 305-307, 309, 404-407, 409-414, 503, 509, 515-519

CH-04

6. Preparation Information:

This data package shall address, as a minimum:

- a. Agenda
- b. Copies of responses to action items and recommendations generated at prior reviews
- c. **Presentation** material (e.g., viewgraph copies) for the subject review
- d. Analyses and reports required at the review
- e. Supportive material. Where supportive material has been submitted prior to or concurrent with this requirement, such material may be incorporated within this requirement by reference.
- f. Results of the functional and interface tests

CDRL NO. 032 (CONTINUED)

- g. **Malfunctions and corrective actions**
- h. **Reliability predictions**
- i. **Comparison of measured performance with requirements and discussion of the effect of any variance and waivers**
- j. **Mission operation constraints**
- k. **Contamination avoidance requirements**
- l. **Safety requirements**
- m. **Maintenance and operation manuals**
- n. **Spares for flight equipment and GSE**
- o. **GSE maintenance service contracts**
- p. **Review of instrument handling procedures**
- q. **Interface concerns, problems and solutions.**
- r. **Status of launch site preparation activities**
- s. **Orbital operations plans**
- t. **End-item data packages (submit a summary of the content prior to review and have package available for inspection at review)**
- u. **Compatibility of instrument with observatory flight support equipment, ground support equipment and operational ground equipment**

This applies to the PFM and all Flight Models.

The minutes and results of this review, with action items and responses (CDRL #225), shall also be submitted.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
SOFTWARE TEST PLAN	033

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 10.2.1
 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3, Table 4-1
 EOS Configuration Management Plan (420-02-02), Figure 3-1

4. Use:

Provide overall view of the instrument's software acceptance test program, detailing test philosophy objectives and rationale for all software testing and hardware/software integration activities planned for the program.

5. Related Documents:

CDRL #006, 008, 017, 021-022, 217, 306, 309, 402

6. Preparation Information:

This shall incorporate the requirements of the EOS PAR (420-05-01), and the MODIS-N Software Management Requirements (422-20-04), and shall be prepared in accordance with NASA-DID-M400, "Assurance Plan" section 4.0. "Verification and Validation Planning".

CH-03

This shall include, as a minimum:

- a. **Tests to be accomplished to demonstrate that the software meet requirements**
- b. Test environment
- c. Required test data
- d. Expected results
- e. Test schedules

CDRL NO. 033 (CONTINUED)

f. **Special** operating conditions (if required)

This shall also describe any special test support equipment (simulators, emulators, etc.) needed for the test activities, as well as support from other organizations that may be required to complete the testing.

Issuance of a new or revised test plan shall be required if modifications to the baselined software are implemented. This shall be accomplished in accordance with the EOS configuration management system defined in the EOS Configuration Management Plan (420-02-02).

This shall be submitted in accordance with Part B (0XX Series) of this document.

CDRL NO. 033 (CONTINUED)

This shall also describe any special test support equipment (simulators, emulators, etc.) needed for the test activities, as well as support from other organizations that may be required to complete the testing.

Issuance of a new or revised test plan shall be required if modifications to the baselined software are implemented. This shall be accomplished in accordance with the EOS configuration management system defined in the EOS Configuration Management Plan (420-02-02).

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

<p>1. <u>Title:</u></p> <p>LAUNCH COMPLEX SAFETY PLAN (LCSP)</p>	<p>2. <u>CDRL No.:</u></p> <p>034</p>	<p>CH-04</p>	
<p>3. <u>Reference:</u></p> <p>EOS Performance Assurance Requirements (420-05-01), Para. 4.10 WSMCR 127-1 Para 5.7</p>			<p>CH-04</p>
<p>4. <u>Use:</u></p> <p>Provides a plan with associated requirements for instrument operations at the Western Space and Missile Center (WSMC).</p>			
<p>5. <u>Related Documents:</u></p> <p>CDRL #007, 024, 032, 106, 107, 224, 406, 409, 411, 414 EOS General Instrument Interface Specification (420-03-02)</p>			
<p>6. <u>Preparation Information:</u></p> <p>Describe all launch site requirements for each mission beginning with the arrival of MODIS-N and GSE at WSMC through lift-off. A flow plan and a time line should be provided for each mission. In addition, the document should address requirements for at least the following, as applicable:</p> <ol style="list-style-type: none"> a. Test and build-up facility requirements, including floor space, electrical power, and cleanliness b. Use of large scale GSE, e.g. test consoles and handling fixtures at each facility that is planned to be used c. Instrument unique testing d. EOS launch system integrated testing, including ground segment end-to-end testing e. Personnel facilities 			

CDRL NO. 034 (CONTINUED)

f. Staffing plan

g. Instrument transportation and servicing

This shall be prepared in accordance with the EOS PAR (420-05-01) and WSMCR 127-1.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

SPARES PROGRAM PLAN

2. CDRL No.:035

3. Reference:

Statement of Work (422-20-03), Para. 10
 MODIS-N Specification (422-20-02)
 EOS Performance Assurance Requirements (420-05-01), Para. 1.3
 EOS Configuration Management Plan (420-02-02), Figure 3-1

4. Use:

To review contractor's spares program.

5. Related Documents:

CDRL #005-007, 016, 018, 020, 031, 032, 409, 412, 414

6. Preparation Information:

The Spares Program Plan shall define and justify the contractor's position for the spares proposed for the MODIS-N program. This plan shall also present the schedule and method for obtaining the spares.

Further, this plan shall address all of the requirements of the SOW (422-20-03), paragraph 10.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

SCHEDULE MANAGEMENT PLAN

2. CDRL No.:

036

3. Reference:

Statement of Work (422-20-03), Para. I, II, and 1 thru 12
 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
 4.2.4

4. Use:

For understanding and mapping out in detail, program delivery requirements
 and for developing, maintaining and updating the schedule data base.

5. Related Documents:

CDRL #001, 003, 004, 008, 014, 015, 037, 523, 538-543

CH-04

6. Preparation Information:

The contractor shall prepare a comprehensive schedule plan, which describes their schedule system. This plan shall explain/describe the program and schedule administration control. It is the intent of the Government to use the contractor's in-house schedule system as the mechanism for reporting schedule status provided that the schedule control and monitoring system is capable of the following:

- a. Maintaining the original schedule baseline dates on tabular reports/listings, milestone charts and networks for comparison with current dates
- b. **Relating** events/milestones to the Work Breakdown Structure.
- c. Defining the internal relationships between events
- d. Defining the time duration of all tasks such as design, manufacturing, and testing, etc
- e. Defining the planned start and completion dates for all milestones and events

CDRL NO. 036 (CONTINUED)

- f. **Defining** the slack/float for all subsystems
- g. **Defining** the impact of all early starts or slips on future milestones/events
- h. Providing the status of each subsystem and/or black box by actual and project dates.
- i. Providing the status of all major test and integration articles (GSE) by actual and projected dates
- j. Defining the Path of Criticality

This schedule plan should describe how the schedules are developed, maintained and updated. The internal review cycle of the scheduling process shall be explained. The contractor shall explain how the internal audits/review ensure that scheduling data reported to the Government accurately reflect the work status.

This schedule plan shall describe the method used to ensure compliance required by the GSFC Performance Measurement System (PMS) GHB 5112.1 issued September 23, 1988, for vertical and horizontal traceability. In addition, this plan will explain how the traceability is performed/demonstrated from the work packages to the automated networks.

The contractor shall explain the configuration of the scheduling system and the method used to summarize data from a number of Intermediate Networks into a Summary Network.

The contractor will perform an audit to verify that start/completion dates for events reflected on the Summary Network are the same dates as the Intermediate Networks and this also applies to the float/slack. It is understood that this summarization will necessitate obtaining the critical path from the Intermediate Network.

This **schedule** plan and the corresponding schedules shall be submitted in accordance with Part B (0XX Series) of this document.

CH-04

DESCRIPTION OF REQUIRED DATA

1. Title:

LEVEL 1 MASTER SCHEDULE

2. CDRL No.:

037

3. Reference:

Statement of Work (422-20-03), Para. I, II, and 1 thru 12
 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
 4.2.4

4. Use:

To give an understanding on the development cycle of the instrument

5. Related Documents:

CDRL #001, 003, 004, 008, 014, 015, 036, 038, 523, 538-543

CH-04

6. Preparation Information:

The contractor shall provide the Government with an automated Level I Network, which will reflect the summary of the Intermediate Networks. This will be accomplished so that start/completion dates for events shown on the Summarized Schedule are the same dates as the Intermediate Networks, and this also applies to the float/slack.

This will prohibit using this network for the path of criticality. The critical path shall be derived from the Intermediate Networks.

The Level I Network shall include programmatic milestones/events for the overall program including Preliminary Design Reviews (PDR), Critical Design Reviews (CDR) and other major reviews. This schedule shall contain an overview of the entire program from Design, Manufacturing, Integration and Test through Launch.

CDRL NO. 037 (CONTINUED)

In addition the contractor shall furnish the Government with a manual (art) Level I Chart that reflects the major programmatic in addition to the major designs, fabrications, tests, assembly and after assembly tests. This chart must not exceed 8 1/2" x 11" and be suitable for preparing a viewgraph for presentation to various levels of management.

CH-04

This schedule plan and the corresponding schedules shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

ROLLING WAVE SCHEDULE

2. CDRL No.:

038

3. Reference:

Statement of Work (422-20-03), Para. I, II
 Schedule Management Handbook for the
 Flight Projects Directorate (FPRO 1010)

4. Use:

Describes how the project is organized for a 12 month planning period

5. Related Documents:

CDRL # 004, 037

CH-04

6. Preparation Information:

This schedule shall be prepared in accordance with Section 4.4 of FPRO 1010, "Schedule Management Handbook for the Flight Projects Directorate".

This schedule shall address the overall approach for planning long range activities for the MODIS-N instrument development. This schedule shall be developed by increasing the level of detail on planning the basic building blocks (work packages) as the MODIS-N instrument development activities unfold. In essence the "Rolling Wave" depicts a series of 12 month snapshots of the network. During each month, a new month is planned in detail. The completed activities from the oldest month(s) are then dropped from the snapshot while displaying 3 months of historical data.

This **schedule** shall consist of a Now term, Near term and Far term. The Now term activities are planned for next month, down to the detailed "work package" level. The Near term activities are planned in rather small discrete efforts of 1 to 3 months. The Far term is planned at a higher level of detail and in segments commonly referred to as "Planning packages". These packages may include related activities that have durations of up to a year. As the "Time Now" line moves to the right each month, the activities for the next month are planned.

CDRL NO. 038 (CONTINUED)

This **planning** method will be used to ensure that the entire project is **planned and** all relationships are established; however the MODIS-N project planners can maintain a great deal of flexibility in performing "what-ifs" at the planning package level in planning the Far term. This concept provides the Project with the level of detail to manage the immediate effort and a lesser amount of detail in the more distance efforts.

This shall be submitted in accordance with Part B (0XX Series) of this document.

CH-04

DESCRIPTION OF REQUIRED DATA

1. Title:NON-IONIZING RADIATION SOURCE
USAGE PLAN**2. CDRL No.:**

039

3. Reference:MODIS-N Specification (422-20-02)
EOS Performance Assurance Requirements (420-05-01), Para. 4.11

4. Use:

To review the types of source for non-ionizing radiation

CH-04

5. Related Documents:

NONE

6. Preparation Information:

The developers of instruments containing non-ionizing radiation sources shall provide a usage plan in accordance with the PAR (420-05-01). The plan shall describe the type of radiation, power, wavelength, and beam divergence of the source, as well as planned pointing vectors and mission times of operation.

This shall be submitted in accordance with Part B (0XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
SOFTWARE REQUIREMENTS REVIEW (SRR) DATA PACKAGE	040

3. Reference:

Statement of Work (422-20-03), Para. I
MODIS-N Specification (422-20-02)
MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3
EOS Configuration Management Plan (420-02-02), Figure 3-1
EOS Performance Assurance Requirements (420-05-01), Para. 10.2.5

4. Use:

Presents the software requirements relative to the system level requirements for each GSE and MODIS-N flight system and interface.

5. Related Documents:

CDRL #008, 014, 016, 017, 020, 021, 026, 028, 104, 225, 306, 309, 402, 508, 514

6. Preparation Information:

This design review data package shall address as a minimum:

- a. Agenda
- b. **Copies** of responses to action items and recommendations generated **at prior reviews**
- c. Presentation material (e.g. viewgraphs) for the subject review
- d. Analyses and reports required at the review
- e. Supportive material. Where supportive material has been submitted prior to, or concurrent with, this requirement, such material may be incorporated within this requirement by reference.

CH-04

CDRL NO. 040 (CONTINUED)

- f. All documentation as called for in the MODIS-N Software Management Requirements (422-20-04)
- g. Description of the approach used to develop, analyse, synthesize, document, and control the requirements
- h. Specification of requirements for interfaces between the software and its external environment. This includes the identification and description of each interface, as well as the requirements governing each interface
- i. Identified risks with the associated risk management control mechanisms
- j. Re-evaluation of the size and scope of the remainder of the software development effort, noting any changes to current resource and schedule data

This shall be submitted in accordance with Part B (0XX Series) of this document.

CH-04

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
RADIOMETRIC MATH MODEL	101

3. Reference:

Statement of Work (422-20-03), Para. 2 and 3
 MODIS-N Specification (422-20-02)
 EOS Calibration Plan (420-03-01), Para. 3

4. Use:

For evaluating the end-to-end radiometric performance of the Instrument; for allocation of error budget, etc.

5. Related Documents:

CDRL #016, 018, 020, 102-104, 207, 220, 222, 404, 410
 EOS General Instrument Interface Specification (420-03-02)

6. Preparation Information:

The Radiometric Math Model shall be used to:

- a. Evaluate the end-to-end radiometric performance of the MODIS-N instrument; conduct sensitivity analyses; determine absolute and relative calibration accuracies; identify major error contributors which can be eliminated during the design phase; identify impact of error budget trades; assess instrument performance in terms of Signal Noise Ratio (SNR), Noise Equivalent temperature (NE Δ T), stability in orbit, etc.
- b. **The model shall be related to actual test and calibration data; the model shall be updated and refined during the course of the MODIS development program until it simulates instrument performance accurately.**
- c. Also to be included in the model are on-board and preflight ground laboratory calibration algorithms and a data book that contains all pertinent measured data required by the calibration algorithms. The on-board calibration algorithms are used along with ground calibration

CDRL NO. 101 (CONTINUED)

data to demonstrate that the absolute and relative radiometric **accuracies** are being met. The on-board calibration algorithms are **deliverables**, in a form suitable for incorporation into the Earth Observing System Data and Information System (EOSDIS), which convert from digital counts to calibrated spectral radiances based upon all on-board calibration devices. The calibration data shall also be provided in a mutually agreed upon computer-compatible form.

This shall be submitted in accordance with Part B (1XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

STRUCTURAL MATH MODEL

2. CDRL No.:102

3. Reference:

Statement of Work (422-20-03), Para. 2 and 3
 MODIS-N Specification (422-20-02)
 EOS General Instrument Interface Specification (420-03-02), Section 3.8,
 Appendix E
 EOS Calibration Management Plan (420-03-01), Para. 3

| CH-07

4. Use:

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

5. Related Documents:

CDRL #016, 020, 101, 103, 104, 113, 207, 220

| CH-04

6. Preparation Information:

The deliverable MODIS-N Structural Math Model shall meet all requirements listed in Appendix A of the EOS General Instrument Interface Specification (420-03-02). In addition to these requirements, the math model shall be compared with a modal survey carried out on the structural 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.

| CH-05

This shall be submitted in accordance with Part B (1XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

<u>1. Title:</u>	<u>2. CDRL No.:</u>
THERMAL MATH MODEL	103

3. Reference:

Statement of Work (422-20-03), Para. 2 and 3
 MODIS-N Specification (422-20-02)
 EOS Calibration Management Plan (420-03-01), Para. 3
 EOS General Instrument Interface Specification (420-03-02), Sect. 4.7,
 Appendix E

| CH-07

4. Use:

To evaluate the thermal performance of the instrument.

5. Related Documents:

CDRL #016, 020, 101, 102, 104, 113, 207, 220

| CH-04

6. Preparation Information:

The model shall be composed of at least 250 nodes. The Thermal Math Model shall have sufficient detail of all subsystems and critical interfaces to accurately predict absolute interfaces. These models shall be verified and refined after comparison with thermal test data.

SINDA-compatible and TRASYS-compatible reduce-node versions of the full instrument thermal math model, appropriately documented, are required for analytical integration with the spacecraft. A users guide shall be provided for deliverable math models.

This shall be submitted in accordance with Part B (1XX series) of this document.

DESCRIPTION OF REQUIRED DATA

<u>1. Title:</u>	<u>2. CDRL No.:</u>
ENGINEERING ANALYSES REPORTS	104

3. Reference:

Statement of Work (422-20-03), Para. 2 and 3
 MODIS-N Specification (422-20-02)
 EOS General Instrument Interface Specification (420-03-02), Appendix E

| CH-07

4. Use:

To aid in making judgments and decisions regarding numerous specific technical subjects relative to the MODIS-N design. These analysis shall be reviewed periodically through the program both formally (Design Reviews), and informally (with GSFC MODIS-N Team).

5. Related Documents:

CDRL #014, 016, 017, 019, 020, 026, 028-032, 040, 101-103, 105, 106, 109, 111-113, 204, 206-208, 216, 220-222, 226, 526

| CH-04

6. Preparation Information:

Formal documentation of these analyses is required for the design reviews (data package); however, to aid the informal coordination and design monitoring/review with the GSFC team, the Contractor shall supply advance copies of these analyses (herein called Engineering Analyses Reports - EARs) to the Technical Officer. Five copies of each EAR carrying the signature of the Contractor's Project Manager shall be delivered on a timely basis - i.e., as they are completed. Each EAR shall be typed but may contain hand-drawn sketches to preserve informality and timeliness. The Contractor at his discretion, may use the EAR's directly or indirectly, as appropriate, to supplement formal documentation requirements so as to avoid unnecessary duplications of effort.

A partial list of possible EARs follows for guidance purposes only and may be amended with the mutual consent of the Contractor and the Technical Officer. Similarly, the schedule due dates for each of these EARs shall be mutually agreed upon.

CDRL NO. 104 (CONTINUED)

Possible List of Engineering Analyses Reports (EARs) include:

- a. Thermal Analysis and Design
- b. Analysis of on-board calibration sources, accuracies and expected changes over lifetime
- c. Analysis of polarization sensitivity, how to minimize, achieve, and demonstrate
- d. Analog amplifier analysis (stage-by-stage, each channel to include SNR, bandwidth, gain, stability, etc.)
- e. Logic and timing circuits - functional description, timing diagrams
- f. Possible Cost Savings, increased cost - effectiveness (end of design definition phase)
- g. Mechanical-Structural Analysis and Design (Technique used for analysis shall be mutually agreed upon by contractor and Technical Officer)
- h. Analysis of Bearing-to-Housing fits, tolerances, thermal effects
- i. Results of computer analysis of optical alignment design, tolerances and error budget
- j. Scan Motor Torque Analysis
- k. Review of how the spacecraft contractor will align and periodically check the alignment of the MODIS-N to the spacecraft
- l. Detailed analysis of power requirements and power profile. Following the initial Systems review a summary updated chart or table shall be supplied monthly
- m. **Detailed** weight breakdown analysis, as well as a summary to be **updated** monthly following Initial Systems Review showing the **changes**, reasons, and differentiation between calculated, estimated or actual weights
- n. Analysis of expected Scan Linearity and Jitter
- o. Design analysis of cooler shield including requirements for contamination and sun protection, alternate approaches and tradeoffs

CDRL NO. 104 (CONTINUED)

- p. **Worst** case thermal analysis of cooler showing adequacy of temperature margin
- q. Worst case performance analysis of all mechanical, electrical and optical systems with regard to radiation, age, voltage, and temperature extremes, etc
- r. Ray trace analysis of the optical-radiation cooler interface

This shall be submitted in accordance with Part B (1XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:CONTRACTOR - GENERATED INTERNAL
TECHNICAL MEMORANDA**2. CDRL No.:**

105

3. Reference:Statement of Work (422-20-03), Para. 2, 3, 4, 9, and 11
MODIS-N Specification (422-20-02)

4. Use:

To review technical memoranda related to the MODIS-N program.

5. Related Documents:

CDRL #014, 016, 020, 032, 104, 221

| CH-04

6. Preparation Information:

This memoranda shall be typed or hand-printed and may contain hand-drawn sketches to preserve informality and timeliness.

This memoranda shall be submitted in accordance with Part B (1XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

HAZARD ANALYSES

2. CDRL No.:106

3. References:

EOS Performance Assurance Requirements (420-05-01), Para. 4.4.1
WSMCR 127-1 Chapters 3 and 5

| CH-07

4. Use:

Provides analyses of critical parameters for identifying potential safety hazards and risks with regard to the MODIS-N instrument hardware.

5. Related Documents:

CDRL #006, 014, 016, 020, 022, 032, 034, 104, 107-110, 112, 204, 207,
208, 216, 412

6. Preparation Information:

Data is to be developed by contractor, in accordance with the EOS PAR (420-05-01) for parameters related to items such as electronics circuits, optics, electromechanical devices, and mechanical devices, and mechanical elements.

This shall be submitted in accordance with Part B (1XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

OPERATIONS HAZARDS ANALYSES

2. CDRL No.:

107

3. Reference:EOS Performance Assurance Requirements (420-05-01), Para. 4.4.1,
4.4.2CH-04
CH-07

4. Use:Provides analyses of systems hazards related to contractor operations for
GSFC review.

5. Related Documents:CDRL #006, 014, 016, 022, 029, 030, 032, 034, 108-110, 112, 204, 207,
208, 216, 308, 406, 412

6. Preparation Information:Performance of an Operations Hazard Analysis (OHA) shall consider the
following:

- a. Planned configuration at each phase of activity
- b. Supporting tools or other equipment specified for use
- c. Operational/task sequence, concurrent task effects and limitations
- d. Biotechnological factors, regulatory or contractually specified personnel
safety and health requirements
- e. Potential and unplanned events including hazards introduced by
human errors

CDRL NO. 107 (CONTINUED)

The OHA shall be used to identify hazardous operations and tasks, the hazardous conditions associated with the tasks, the causes of the hazardous conditions, the risks associated with the hazardous conditions, and recommendations to eliminate or reduce the effects of the hazardous conditions.

The required data for an OHA are drawings, specifications, timeliness, procedures, schematics, and hazard analysis of the flight and ground support equipment involved in the operation being analyzed.

The OHA shall be initiated as soon as practicable in the development phase of the Project.

The contractor shall perform the following:

- a. Identify all hazardous conditions during testing and ground operations
- b. Establish requirements for special equipment, skills, or training
- c. Establish cautions and warnings in procedures
- d. Detail the proper sequence of tasks to be performed
- e. Identify additional safeguards or procedure changes, as necessary

These shall be prepared in accordance with the EOS PAR (420-05-01).

These shall be submitted in accordance with Part B (1XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
FAILURE MODES AND EFFECTS ANALYSIS (FMEA)	108

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 7.3.1
MODIS-N Software Management Requirements (422-20-04), Para. 4.6.1

4. Use:

Provides insight into failure mode identification, effect, and criticality.
Provides background for mission and instrument operations contingency planning.

5. Related Documents:

CDRL #006, 008, 016, 020, 022, 032, 104, 106, 107, 109-112, 208, 216,
308, 412, 507, 512

6. Preparation Information:

The FMEA shall be prepared and updated in accordance with the EOS PAR (420-05-01) and GSFC S-302-89-01, dated 12/01/89, "Failure Modes and Effects Analysis Procedures for Unmanned Spacecraft and Instruments." The following shall be provided, as a minimum:

- a. Failure modes
- b. **Severity levels of the failure effects.** The severity levels in GSFC S-302-85-01 are modified to read as follows:
 - Criticality 1: Catastrophic. A single failure that could result in loss of human life or serious injury to personnel, or loss of a launch facility, the launch vehicle, or a primary mission objective.
 - Criticality 2: Critical. A single failure that could result in damage to a launch facility or launch vehicle, significant degradation of science products (as defined by the Project), or less of a secondary mission objective.

| CH-04

CDRL NO. 108 (CONTINUED)

- Criticality 3: Loss of redundancy or an effect less severe than that of a Criticality 2 failure mode.

c. Critical Items List (CIL)

In addition to the analysis and the critical items list, a summary report shall be prepared.

This shall be submitted in accordance with Part B (1XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

PARTS AND DEVICES STRESS ANALYSES

2. CDRL No.:

109

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 7.3.3

4. Use:

Provides EEE parts and devices stress analyses for evaluation of the MODIS-N instrument circuit designs and MODIS-N instrument parts, devices, and materials.

5. Related Documents:

CDRL #006, 016, 020, 022, 032, 104, 106-108, 110, 112, 204, 208, 216, 309, 412

EOS General Instrument Interface Specification (420-03-02)

MODIS-N Unique Instrument Interface Document

| CH-04

6. Preparation Information:

These analyses are to be developed by the contractor in accordance with conformance to the derating policy of MIL-STD-975, as well as the EOS PAR (420-05-01).

Analyses of each component (black box) shall be reported to determine the adequacy of the derating of each application of EEE parts and devices.

The **analyses** reports shall include, as a minimum:

- a. **Consideration** of all expected environmental stresses
- b. **Consideration** of all significant operating parameter stresses at the extremes of anticipated environments
- c. **Specific identification** of each part application that does not conform to the approved derating policy

CDRL NO. 109 (CONTINUED)

These **shall** be retained on-site and shall be made available to the MODIS-N Technical Officer and Flight Assurance Manager, upon request, in accordance with Part B (1XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

RELIABILITY ASSESSMENT

2. CDRL No.:110

3. Reference:EOS Performance Assurance Requirements (420-05-01), Para. 7.3.2

4. Use:

1) Sensitivity analyses; 2) evaluations of the effects of design trade-offs or configuration changes; 3) evaluations of the ability of the design to achieve the EOS mission life requirement; 4) probability of success (P_S) evaluation.

5. Related Documents:

CDRL #020, 022, 030, 032, 108, 109, 111, 204, 216, 512
 EOS General Instrument Interface Specification (420-03-02)
 MODIS-N Unique Instrument Interface Document

| CH-04

6. Preparation Information:

This shall be prepared in accordance with the EOS PAR (420-05-01) as follows:

- a. Initial assessments shall use the parts count reliability prediction methodology of MIL-HDBK-217.
- b. As design matures, develop a complete reliability block diagram, failure definitions, and mathematical models in accordance with MIL-HDBK-217.

This shall be submitted in accordance with Part B (1XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:TREND ANALYSIS (LIST OF PARAMETERS
TO BE MONITORED)**2. CDRL No.:**

111

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 7.3.5

4. Use:

Provides tracking of critical engineering and performance parameters.

5. Related Documents:CDRL #006, 014, 016, 020, 022, 032, 104, 108, 110, 204, 208, 215, 216
EOS General Instrument Interface Specification (420-03-02)
MODIS-N Unique Instrument Interface Document

| CH-04

6. Preparation Information:

Provide a list identifying key parameters that relate to performance stability. This is a list of parameters to be monitored for trends leading towards loss of stability of operation of MODIS-N.

Establish a system for recording and analyzing desired parameters.

Results to be reviewed with operational personnel prior to launch. Trends should be recorded throughout the mission by the operational personnel.

This shall be performed in accordance with the EOS PAR (420-05-01).

This shall be submitted in accordance with Part B (1XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

WORST CASE ANALYSES

2. CDRL No.:112

3. References:EOS Performance Assurance Requirements (420-05-01), Para. 7.3.4

4. Use:

Provides worst case analyses of critical parameters to determine worst case margins, limits and stresses.

5. Related Documents:

CDRL #016, 020, 022, 032, 104, 106-109, 204, 216

| CH-04

6. Preparation Information:

Data is to be developed by contractor, in accordance with the EOS PAR (420-05-01) for parameters related to items such as electronics circuits, optics, electromechanical devices, and mechanical devices, and mechanical elements.

This shall address the worst case analyses performed on each component. These analyses shall encompass the mission life and shall consider all parameters set at minimum and maximum limits and include the effect of environmental stresses on the operation or parameter.

This shall be submitted in accordance with Part B (1XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

STRESS ANALYSIS REPORT

2. CDRL No.:

113

3. Reference:

Statement of Work (422-20-03) Para. II Section 2 and 3
 EOS Performance Assurance Requirements (422-05-01), Para. 3.4.3.1
 MODIS-N Specification (422-20-02)

4. Use:

For evaluating the results of structural design limit loads

5. Related Documents:

CDRL #102, 103, 104

6. Preparation Information:

The stress report shall be delivered in accordance with the PAR (422-05-01). The analysis shall be updated when the test-verified model is delivered. As a minimum, it shall contain the following:

- a. Stress analysis results for current design limit loads, with yield and ultimate factors applied.
- b. Comprehensive Margins of Safety (M.S.) Summary for all load cases.

The **initial stress** assignment shall be based on the preliminary design loads. The **developer** shall keep a M.S. Summary updated as the design of the **structure changes**, mathematical models are refined, and/or new loads analyses are performed

This shall be submitted in accordance with Part B (1XX Series) of this document.

CH-04

DESCRIPTION OF REQUIRED DATA

1. Title:PREVIOUSLY DESIGNED, FABRICATED, OR
FLOWN HARDWARE**2. CDRL No.:**

201

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 1.4

4. Use:

Provides evaluation of existing hardware designs to ensure that they are compatible with MODIS-N performance, reliability, and implementation.

5. Related Documents:CDRL #006, 016, 020, 032
EOS General Instrument Interface Specification (420-03-02)
MODIS-N Unique Instrument Interface Document

6. Preparation Information

This data shall be prepared in accordance with the EOS PAR (420-05-01) and shall incorporate the following, as a minimum:

- a. Comparison of each performance, design, environmental, and interface requirement, including margins, for the EOS and MODIS-N Projects with the corresponding previous requirement
- b. Comparison of each performance assurance requirement for the EOS and MODIS-N Projects with the corresponding previous requirement
- c. Identification of waivers and deviations accepted on previous program
- d. Comparison of manufacturing information for the proposed hardware with that for the previous hardware

CDRL NO. 201 (CONTINUED)

- e. **Description of all flight experience with the proposed hardware
(include failures/anomalies, their cause, and any corrective action)**

This shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

<u>1. Title:</u>	<u>2. CDRL No.:</u>
DATA ON UNCURED OUT-OF-DATE MATERIALS	202

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 6.2.7

4. Use:

Provides data on out-of-date materials, proposed for use on MODIS-N, for GSFC review and approval. It also allows for the certification of polymeric materials whose uncured constituents have exceeded their stated shelf life.

5. Related Documents:

CDRL #006, 218, 505, 506, 525

| CH-04

6. Preparation Information

Data from appropriate test to prove that the properties of the material have not been compromised for its intended use.

This shall be prepared in accordance with the EOS PAR (420-05-01).

This shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

CONFIGURATION MANAGEMENT STATUS REPORT

2. CDRL No.:203

3. Reference:

Statement of Work (422-20-03), Para. 1
 MODIS-N Specification (422-20-02)
 EOS Configuration Management Plan (420-02-02), Para. 1.2, 1.3

4. Use:

For accessing in near real-time the status of configuration management activities.

5. Related Documents:

CDRL #001, 005, 027, 501, 510-513, 521

| CH-04

6. Preparation Information:

This report shall identify status of in-progress configuration changes, new submitted configuration change requests, and contemplated changes. The report shall also address problems and proposed solutions.

This report shall be brief, to the point, and be a part of the monthly status report to the MODIS-N Technical Officer and shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
PERFORMANCE ASSURANCE STATUS REPORT	204

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 1.6, 2.5
 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
 4.2.6, Table 4-1

| CH-04

4. Use:

Provide periodic status and information regarding the assurance activities and any deficiencies that may affect the end product.

5. Related Documents:

CDRL #001, 006, 022, 027, 104, 106, 107, 109-112, 205, 208, 209, 211-214, 501, 505, 523

6. Preparation Information

This shall be prepared in accordance with the EOS PAR (420-05-01) and shall include the following items, as a minimum:

- a. Significant assurance problems, their impact, and proposed corrective actions
- b. Key organization and personnel changes
- c. **Unresolved** hazards (safety program)
- d. **Summary** of significant analysis, inspection, and test activities
- e. Status of procurements and subcontractor performance assurance programs
- f. Summary of audit reports
- g. Results of Alert surveys

CDRL NO. 204 (CONTINUED)

- h. NSPAR status
- i. Part/device procurement or screening activities
- j. Progress in closure of failure reports
- k. Summary reports of developer reviews
- l. Packaging Review Data

| CH-04

The Performance Assurance Status Report shall be submitted either as part of the monthly report or as a separate submittal to NASA. The contractor shall indicate in the implementation plan which method of submittal will be used. Negative reports are required.

This should not only discuss the deficiencies, but also the cause of the deficiencies and the intended/actual corrective action.

This shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

AUDIT REPORTS

2. CDRL No.:205

3. Reference:EOS Performance Assurance Requirements (420-05-01), Para. 1.9.2

4. Use:

Provide results of contractor and subcontractor audits to insure compliance with the implementation plan and to insure that any deficiency corrective action has been implemented.

5. Related Documents:CDRL #001, 006, 204, 501

6. Preparation Information

A documented account of audits shall be provided to management of the audited organization with recommendations for correction of deficiencies. Audit reports shall be made available to the government representative upon request.

These shall be prepared in accordance with the EOS PAR (420-05-01).

These shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:COMPONENT AND SUBASSEMBLY TEST REPORTS
FOR SUBCONTRACTED ITEMS**2. CDRL No.:**

206

3. Reference:Statement of Work (422-20-03), Para. 2, 3, 5, 6, 7, 8, and 9
MODIS-N Specification (422-20-02)
EOS Performance Assurance Requirements (420-05-01), Para. 3.2.5

4. Use:Provides descriptions of tests and test results obtained on components or
subassemblies acquired by subcontract by the instrument contractor.

5. Related Documents:

CDRL #020, 032, 104, 207, 218, 220, 221, 503

| CH-04

6. Preparation Information:As a minimum these reports shall identify the requirements and test units,
test fixtures, environment, test results, and any failures and corrective
actions.

These shall be prepared in accordance with the EOS PAR (420-05-01).

These shall be submitted in accordance with Part B (2XX Series) of this
document.

DESCRIPTION OF REQUIRED DATA

1. Title:

ENGINEERING TEST REPORTS

2. CDRL No.:207

3. Reference:

Statement of Work (422-20-03), Para. 1,2,3,5,6,7,8, and 9
 MODIS-N Specification (422-20-02)
 EOS Performance Assurance Requirements (420-05-01), Para. 3.2.5

4. Use:

For review of tests and test results obtained for engineering tests performed on the instrument or instrument subsystems.

5. Related Documents:

CDRL #016, 020, 021, 026-030, 032, 101-104, 106, 107, 206, 208, 216, 217, 219-222, 407, 409, 411, 412, 503
 EOS General Instrument Interface Specification (420-03-02)

| CH-04

6. Preparation Information:

These reports shall identify, as a minimum, the test requirements, test limits, test fixtures environment, test equipment, test results, and any failures and corrective actions.

These shall be prepared in accordance with the EOS PAR (420-05-01).

These shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

PERFORMANCE VERIFICATION REPORTS

2. CDRL No.:

208

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 3.2.5

4. Use:

Provide summary of integration and testing results, conformance, non-conformance, and trend data.

5. Related Documents:

CDRL #006, 022, 028, 030, 032, 104, 106-109, 111, 204, 207, 215, 216,
308, 412
EOS General Instrument Interface Specification (420-03-02)

| CH-04

6. Preparation Information:

Integration and test reports are required for all such activities commencing at component level testing for each mission. Contents of these reports shall include, as a minimum:

- a. Summary of the test results of each activity and an assessment of the quality and acceptability of the item tested
- b. Summary of the non-conformance occurring during the test and their resolution and corrective actions taken
- c. **Trends** in the performance of critical components (See CDRL #215)
- d. **Actual** sequence of these operations including dates and times
- e. For thermal testing, tabulation of test target temperatures and actual test temperatures for all equipment and components
- f. For thermal balance testing, a tabulation of test prediction and actual temperatures and a tabulation of other pertinent targeted parameters vs. their actual test values, such as heater powers, heater plate temperatures, solar intensity, etc.

CDRL NO. 208 (CONTINUED)

These **shall** be prepared in accordance with the EOS PAR (420-05-01).

These **shall** be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

MALFUNCTION/FAILURE REPORTS

2. CDRL No.:

209

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 8.13.2.1

4. Use:

Provides reporting, monitoring, and closure of all malfunctions and failures and their corrective actions for the MODIS-N instrument.

5. Related Documents:

CDRL #006, 027-032, 204, 210-214, 403, 514

| CH-04

6. Preparation Information:

These reports shall provide immediate notification by telecon and fax to both the MODIS-N Technical Officer and Flight Assurance Manager of a malfunction or failure.

These reports provide all information required to adequately identify and track subsequent actions relative to any failure or malfunction. Each iteration shall contain the items of information listed on GSFC Form 4-2 or approved alternate as pertinent to the update iteration being submitted.

Submittal of the data in approved computer readable form shall be in monthly composite updates of all currently open malfunction reports (with each data item separately identified to its respective MR). When each MR is closed, the next monthly computer composite shall carry the closure update of all Form 4-2 data on that MR.

Malfunction/failure reports shall be submitted to the GSFC at the time of occurrence, at the completion of analysis and assignment of corrective action, and at closure.

CDRL NO. 209 (CONTINUED)

Malfunction/failure reports submitted to the GSFC for closure shall include a copy of **all** referenced data and shall have had all corrective actions accomplished and verified.

Documentation requirements for report close-outs are defined in CDRL #210.

These shall be prepared in accordance with the EOS PAR (420-05-01).

These shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

MRB DECISIONS ON NON-CONFORMANCE

2. CDRL No.:

210

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 8.13.1.3

4. Use:

Provides information to GSFC relative to contractor MRB actions taken with regards to nonconforming material.

5. Related Documents:

CDRL #006, 032, 209, 211, 212, 403, 510, 511

| CH-04

6. Preparation Information:

Prepare in contractor's format in accordance with the guidelines in the EOS PAR (420-05-01). Provide sufficient detail and supporting material to back up the MRB decisions.

Decisions resulting in recommendations for "repair" or "use as-is" shall require additional documentation.

Submit in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
PROBLEM AND FAILURE REPORT CLOSE-OUT	211

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 8.13.2.2

4. Use:

Provides all data required for contractor and GSFC approval for close out of malfunction/failure reports.

5. Related Documents:

CDRL #006, 027, 029-032, 204, 209, 210, 403

6. Preparation Information:

Provide signed close out of each report form generated under the requirements of CDRL #209. Attach all supportive documentation relative to the close out.

This shall be prepared in accordance with the EOS PAR (420-05-01).

This shall be submitted in accordance with Part B (2XX Series) of this document.

| CH-04

DESCRIPTION OF REQUIRED DATA

1. Title:

ALERTS

2. CDRL No.:

212

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 8.14

4. Use:

Provides for the preparation of Alerts on problems within the scope of the GIDEP system.

5. Related Documents:

CDRL #006, 032, 204, 209, 210, 213, 214, 514

| CH-04

6. Preparation Information:

The contractor shall prepare Alerts in accordance with the EOS PAR (420-05-01) on DD Form 1938 through block 15.

If a GIDEP member, the contractor shall transmit the Alert to GIDEP with an additional copy transmitted to GSFC. If the contractor is not a participant in GIDEP, the contractor shall submit the completed form and supporting data to GSFC for transmittal to GIDEP.

The original report shall be submitted in accordance with Part B (2XX Series) of this document.

In any case, an information copy shall be submitted to:

Alert Coordinator
Code 311
Goddard Space Flight Center
Greenbelt, MD 20771

Status summaries of each Alert received within a 30 day period shall be submitted as part of the Monthly Progress Report in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

RESPONSES TO ALERTS

2. CDRL No.:213

3. Reference:EOS Performance Assurance Requirements (420-05-01), Para. 8.14

4. Use:

To inform GSFC of the extent of impact of all reported GIDEP Alerts on the contract hardware so that the Project can plan appropriate corrective actions.

5. Related Documents:CDRL #006, 032, 204, 209, 212, 214

6. Preparation Information:

These responses to GSFC on the GIDEP Alerts shall be prepared in accordance with the EOS PAR (420-05-01) and shall be reported within time intervals requested by GSFC as they impact the project hardware.

Initial responses shall be updated as any Alert report is updated by GIDEP.

These responses to GSFC on the GIDEP Alerts shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

-
- | | |
|-----------------------------------|---------------------|
| 1. <u>Title:</u> | 2. <u>CDRL No.:</u> |
| RESPONSES TO NASA PROBLEM NOTICES | 214 |
-
3. Reference:
- EOS Performance Assurance Requirements (420-05-01), Para. 8.14
-
4. Use:
- To inform GSFC of the extent of impact of on the contract hardware of any special problem notices sent by NASA so that the Project can plan appropriate corrective actions.
-
5. Related Documents:
- CDRL #006, 032, 204, 209, 212-213
-
6. Preparation Information:
- These responses to NASA Problem Notices shall be prepared in accordance with the EOS PAR (420-05-01).
- These responses to NASA Problem Notices shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
TREND ANALYSIS REPORTS (MONITORING OF SELECTED PARAMETERS)	215

3. Reference:

MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
4.2.7, Table 4-1
EOS Performance Assurance Requirements (420-05-01), Para. 7.3.5

4. Use:

Provides tracking of critical engineering and performance parameters for
the MODIS-N instrument.

5. Related Documents:

CDRL #006, 014, 016, 020, 032, 111, 208, 216, 226, 526
EOS General Instrument Interface Specification (420-03-02)

6. Preparation Information

A list of parameters to be monitored for trends, updates to the list, and
trend reports shall be prepared by the contractor in accordance with the
EOS PAR (420-05-01).

In addition, for each mission, a log shall be maintained for each
instrument of the accumulated operating time. The log shall include the
following information, as a minimum:

- a. Identification of hardware item
- b. Serial number
- c. Total operating time since assembly as a unit
- d. Total operating time since last failure
- e. Total additional operating time projected for the unit prior to launch

| CH-04

CDRL NO. 215 (CONTINUED)

- f. **Identification** of key parameters being monitored
- g. **Upper/lower spec tolerance limit** for each parameter being monitored
- h. Summary statement of any trending noted in earlier measurements of each parameter
- i. Observed value (in sequence) for the reporting interval
- j. Assessment of trends to date

These reports shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
HAZARD CONTROL VERIFICATION REPORT	216

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 4.5

4. Use:

Provide status/results of hazard verification activities, including test results, analysis and inspections.

5. Related Documents:

CDRL #006, 007, 014, 016, 020, 022, 032, 034, 104, 106-112, 204, 207, 208, 215, 412

| CH-04

6. Preparation Information

Reports are required for all activities required for each mission evaluation. Contents of these reports shall include, as a minimum:

- a. Summary of the results of each activity and an assessment of the quality and acceptability of the item tested, analyzed and/or inspected
- b. Summary of the non-conformance occurring during the evaluation and their resolution and corrective actions taken
- c. Trends in the performance of critical components
- d. **Actual** sequence of test operations including dates and times

This shall be prepared in accordance with the EOS PAR (420-05-01).

This shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

SOFTWARE TEST REPORTS

2. CDRL No.:

217

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 10.2.3
 MODIS-N Software Management Requirements (422-20-04), Para. 4.3.1,
 Table 4-1

4. Use:

Provide summary of the software acceptance testing and/or retesting activities.

5. Related Documents:

CDRL #006, 008, 021, 022, 026, 028, 032, 033, 207, 415

6. Preparation Information

These reports shall be prepared in accordance with NASA-DID-R009, "Minimum Contents for Test Report ", MODIS-N Software Management Requirements (422-20-04) and EOS PAR (420-05-01).

| CH-03

These reports shall be developed for each test described in the Software Test Plan (CDRL #033) and shall include the following, as a minimum:

| CH-03

- a. Identity and number of planned tests that have been completed
- b. **Conformance** of test results to expected results
- c. **Number**, type, and criticality of discrepancies
- d. Identification of software areas tested
- e. Analysis of any performance requirements that the tested software could affect
- f. Test result summary

CDRL NO. 217 (CONTINUED)

The **actual** test results shall either be attached to the report(s) or **maintained** on-site.

These reports shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:DATA ON NON-CONVENTIONAL APPLICATION
OF MATERIALS**2. CDRL No.:**

218

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 6.2.2, 6.4.

4. Use:Provide data on non-conventional material usage, proposed for use on
MODIS-N, for GSFC review and approval.

5. Related Documents:

CDRL #006, 202, 505, 506

6. Preparation Information

The contractor is allowed to utilize his own reporting system in accordance with the EOS PAR (420-05-01). The contractor shall provide all information requested by the GSFC forms and shall receive approval from the Contracting Officer.

Sufficient data shall be submitted to show that the material under consideration has been verified for the desired application on the basis of similarity, analysis, test, inspection, existing data, or a combination of these methods.

This **data** shall be submitted in accordance with Part B (2XX Series) of this **document**.

DESCRIPTION OF REQUIRED DATA

1. Title:

INSTRUMENT OUTPUT DATA RECORDS REQUIRED
IN SPECIAL DATA REQUIREMENT SECTION OF
THE MODIS-N SPECIFICATION

2. CDRL No.:

219

3. Reference:

Statement of Work (422-20-03), Para. 6, 7, and 8
MODIS-N Specification (422-20-02)

4. Use:

To provide a history record of instrument performance.

5. Related Documents:

CDRL #032, 207, 221, 307

| CH-04

6. Preparation Information:

Whenever the instrument is operated from the System Test Equipment (STE) the contractor shall generate a digital history record, which will be stored on some form of mutually agreed upon media and shall contain all MODIS-N output data plus all ancillary data necessary for the use of the instrument data. All media shall be provided by the contractor.

| CH-09

The contractor shall provide copies of selected portions of the recorded data as requested by the Technical Officer. This shall include all or part of the calibration data plus other selected acceptance test data. These records shall be identified by date, test particulars and location on the storage media.

These records shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:OTHER TECHNICAL REPORTS AND
REISSUED REPORTS**2. CDRL No.:**220

3. Reference:Statement of Work (422-20-03), Para. 2
MODIS-N Specification (422-20-02)
EOS Performance Assurance Requirements (420-05-01), Para. 3.2.5

4. Use:To review other Technical Reports and Reissued Reports.

5. Related Documents:

CDRL #020, 021, 028, 032, 101-104, 206, 207, 221, 222, 503

| CH-04

6. Preparation Information:

These are miscellaneous reports prepared or reissued for the MODIS-N instrument program.

These shall be prepared in accordance the EOS PAR (420-05-01).

These shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

STORAGE TESTING REPORTS

2. CDRL No:221

3. Reference:

Statement of Work (422-20-03), Para. 8
 MODIS-N Specification (422-20-02)
 EOS Performance Assurance Requirements (420-05-01), Para. 3.2.5

4. Use:

To review the results of testing during instrument storage.

5. Related Documents:

CDRL #007, 024, 031, 032, 104, 105, 206, 207, 219, 220, 222, 407

| CH-04

6. Preparation Information:

As a minimum, the reports should identify the test parameters, test limits, test results, test equipment and fixtures, environment, and any failures and corrective actions.

These shall be prepared in accordance the EOS PAR (420-05-01).

These shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

SPECIFICATION COMPLIANCE AND
CALIBRATION DATA BOOKS

2. CDRL No.:

222

3. Reference:

Statement of Work (422-20-03), Para. 6, 7, and 8
MODIS-N Specification (422-20-02)

4. Use:

For demonstrating specification compliance and for full interpretation of the orbital data.

5. Related Documents:

CDRL #018, 019, 032, 101, 104, 207, 220, 221, 307
EOS Calibration Management Plan (420-03-01)

| CH-04

6. Preparation Information:

These data books, which are to be delivered at the end of EM tests and as part of each Pre-Ship Review (PSR) Data Package, are to be a record of all pertinent test and calibration data, including all raw data from which graphs, curves, etc., are prepared, which will be used as an aid in determining the flight worthiness of the instrument.

A summary section shall be prepared for each record book which contains functional equations and charts pertinent to the data contained therein. The set of **summaries** shall depict, as a minimum, all information pertinent to the **performance** requirements, the final system level bench test data, the final **calibration** of the instrument and every instrument subsystem as determined from all tests and calibrations performed prior to delivery of the instrument to the Government, and a set of trend charts of all critical parameters.

These books shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

NEW TECHNOLOGY REPORTS

2. CDRL No.:

223

3. Reference:

Contract Clause G7

4. Use:

Provides for reporting new technology to the Government in accordance with provisions and the requirements set forth in the contract schedule articles and clauses for new technology.

5. Related Documents:

None

6. Preparation Information:

Prepare in accordance with FAR 18-52 235-72 "Plan for New Technology Reporting" December 1984.

These reports shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>	
SAFETY COMPLIANCE DATA PACKAGE	224	

3. <u>Reference:</u>	EOS Performance Assurance Requirements (420-05-01), Para. 4.9	CH-04
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4. <u>Use:</u>	Provides data in conjunction with risk assessment. Provides evidence to the launch facility organization of the safety readiness of the observatory (including Instruments) for processing and launch.	
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5. <u>Related Documents:</u>	CDRL #013, 016, 032, 034, 526 EOS General Instrument Interface Specification (420-03-02)	CH-04
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6. <u>Preparation Information:</u>	This package shall be prepared in accordance with the EOS PAR (420-05-01) and the requirements of WSMCR 127-1 for an "Accidental Risk Assessment Report".	
	This package shall be submitted in accordance with Part B (2XX Series) of this document.	

DESCRIPTION OF REQUIRED DATA

1. Title:

RESPONSES TO FORMAL ACTIONS

2. CDRL No.:225

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 2.2
 EOS Configuration Management Plan (420-02-02), Figure 3-1
 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
 Table 4-1

4. Use:

Provides input to formal responses prepared by the Project.

5. Related Documents:

CDRL #014, 016, 017, 019-021, 026-032, 040

| CH-04

6. Preparation Information

Preliminary responses may be in any form, such as FAX or Telecon, to promote coordination with the Project. Any final responses required by the Project shall be typed and shall include reproducible copies of any supportive material, such as:

- a. Engineering reports
- b. Sketches
- c. Drawing changes
- d. Documentation narrative changes
- e. Test reports, graphs, etc.

These shall be prepared in accordance with the EOS PAR (420-05-01) and shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:FINAL REPORT - DESIGN THROUGH FLIGHT
EVALUATION**2. CDRL No.:**

226

3. Reference:

Statement of Work (422-20-03), Para. 1

4. Use:

To provide an understanding of the instrument and its performance.

5. Related Documents:

CDRL #104, 215, 303, 305, 519, 526

| CH-04

6. Preparation Information:

This report shall provide a system and subsystem description with illustrations and block diagrams. No wiring diagrams or schematics are required. Test information, channel sensitivity and calibration, and flight performance evaluation shall be included. The report shall be a self-contained document in that a reader not familiar with the instrument can obtain a reasonably complete understanding of the instrument without recourse to another document or drawing. The report shall be prepared in accordance with S-250-P-1C (Type III). A draft copy shall be submitted for approval to the Technical Officer before printing.

The contractor shall deliver reproducible copy (copies) including glossy prints and negatives of each illustration, to the following:

National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, MD 20771
ATTN: Graphic Arts Branch/Code 253

This report shall be submitted in accordance with Part B (2XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
SPECIFICATION ON PARTS, MATERIALS, SUBASSEMBLIES/SUBSYSTEMS	301

3. Reference:

Statement of Work (422-20-03), Para. 2, and 11
 MODIS-N Specification (422-20-02)
 EOS Configuration Management Plan (420-02-02), Figure 3-1
 EOS Performance Assurance Requirements (420-05-01), Para. 5.3.2.1,
 5.5.1, 5.5.2

4. Use:

Identification and detail of requirements.

5. Related Documents:

CDRL #016, 032, 505, 506, 524-528
 EOS General Instrument Interface Specification (420-03-02)

6. Preparation Information:

Specification requirements for parts and materials are identified in the EOS PAR (420-05-01).

Specification for subassemblies and subsystems shall address the usage and overall requirements; reference applicable documents; identify specific requirements in all technical areas; identify all interfaces, test and calibration requirements, handling, and environmental requirements.

This **shall be** submitted in accordance with Part B (3XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
INSTRUMENT FUNCTIONAL LOGIC DIAGRAMS	302

3. Reference:

Statement of Work (422-20-03), Para. 2
MODIS-N Specification (422-20-02)

4. Use:

For definition in logic symbology of function, operation, and control of the instrument electronics including the ground support STE and BCU.

5. Related Documents:

CDRL #016, 020, 032, 509, 515-519

6. Preparation Information:

These logic diagrams shall cover the system, subsystem and component electronics and shall identify the signal inputs and outputs, internal signal flow, and the next level external connections.

These diagrams shall be submitted in accordance with Part B (3XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

COMMAND LIST AND DESCRIPTION

2. CDRL No.:303

3. Reference:Statement of Work (422-20-03), Para. 4
MODIS-N Specification (422-20-02)

4. Use:For determining the commands required for instrument operation.

5. Related Documents:

CDRL #016, 017, 021, 026, 028, 032, 226, 305-307, 309, 404, 405, 409-411, 519

| CH-04

6. Preparation Information:

This shall contain a complete list of instrument commands for all instrument modes of operation and sequence testing with a description of their effects, and it identifies any critical commands which may damage the instrument in certain situations.

This shall be submitted in accordance with Part B (3XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

ENGINEERING DRAWINGS FOR MATERIALS
APPLICATIONS

2. CDRL No.:

304

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 6.4

4. Use:

Provides design data on materials application as required for GSFC review and understanding.

5. Related Documents:

CDRL #006, 506

6. Preparation Information:

Provide engineering drawings as requested by the Project Office to support review of materials application for use on MODIS-N.

These drawings shall be submitted in accordance with Part B (3XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

ENGINEERING TELEMETRY DESCRIPTION

2. CDRL No.:

305

3. Reference:

Statement of Work (422-20-03), Para. 4
 MODIS-N Specification (422-20-02)

4. Use:

Definition of all instrument telemetry data.

5. Related Documents:

CDRL #016, 020, 032, 226, 303, 404, 409, 519, 526

6. Preparation Information:

This shall contain a complete list of engineering telemetry data coming from the instrument, including engineering telemetry calibrations, the levels or responses expected in response to commands, and levels which require alerts or immediate actions.

This shall be submitted in accordance with Part B (3XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

SOFTWARE PRODUCT SPECIFICATIONS

2. CDRL No.:

306

3. Reference:

MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
Table 4-1

4. Use:

Provides data and information to aid in software analysis and debugging and software operations and maintenance. Defines software design and interface requirements.

5. Related Documents:

CDRL #008, 017, 021, 026, 028, 032, 033, 040, 303, 309, 402, 415

| CH-04

6. Preparation Information:

Prepared in accordance with the requirements defined in NASA-DID-P000 "Product Specification", and the MODIS-N Software Management Requirements (422-20-04).

These specifications shall include, as a minimum:

- a. Software Concept Document (NASA-DID-P100)
- b. Software Requirements (NASA-DID-P200)
- c. **Software** External Interface Requirements Document (NASA-DID-P200, "Requirements", Sec. 4). This shall be developed and delivered as a part of the Software Requirements document (CDRL #306b).
- d. Software Architectural Design (NASA-DID-P300)
- e. Software Detailed Design Document (NASA-DID-P400)
- f. Software External Interface Design Document (NASA-DID-P300, "Architectural Design" Sec. 5). This shall be developed and delivered as a part of the Software Architectural Design document (CDRL #306d).

| CH-03

CDRL NO. 306 (CONTINUED)

- g. Firmware Support Manual (NASA-DID-P410)
- h. Software Version Description (NASA-DID-P500)
- i. Operations Procedure Manual (NASA-DID-P700)
- j. User's Guide (NASA-DID-P600)
- k. Software Maintenance Manual (NASA-DID-P000, "Product Specification", Sec. 10). This shall be developed and delivered as a part of the Software Product Specification (CDRL #306).

These shall be submitted in accordance with Part B (3XX Series) of this document.

CH-03

DESCRIPTION OF REQUIRED DATA

1. Title:

OPERATION AND MAINTENANCE MANUALS

2. CDRL No.:

307

3. Reference:

Statement of Work (422-20-03), Para. 2 and 9
 MODIS-N Specification (422-20-02)

4. Use:

For operating and servicing MODIS-N and GSE.

5. Related Documents:

CDRL #009, 029, 031, 032, 219, 222, 302, 303, 407, 409-412, 516, 517
 EOS General Instrument Interface Specification (420-03-02)

6. Preparation Information:

Operation and maintenance manuals shall be prepared for the Engineering Model and for all GSE. As a minimum these manuals shall contain the system and subsystem description, function and operation, block diagrams and circuitry description, operation and test procedures, maintenance, and performance data. These manuals, in conjunction with the Drawing Books, shall provide all the information needed for operating and servicing the MODIS-N and GSE. These manuals shall be updated during the program to reflect any changes, including differences between the Engineering Model, the Protoflight Model, and the Flight Model(s). Five copies of these manuals shall be provided for the Engineering Model, Protoflight Model and each Flight Model.

These manuals shall be submitted in accordance with Part B (3XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

<u>1. Title:</u>	<u>2. CDRL No.:</u>
PERFORMANCE VERIFICATION SPECIFICATION	308

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 3.2.2,
3.5.2.2

| CH-04

4. Use:

Provide technical requirements and approach for demonstrating that each hardware item complies with its performance requirements.

5. Related Documents:

CDRL #006, 007, 016, 020, 022, 107-109, 208, 406, 412
EOS General Instrument Interface Specification (420-03-02)
MODIS-N Unique Instrument Interface Document

6. Preparation Information:

This specification shall incorporate the requirements of EOS PAR (420-05-01). For MODIS-N, its components and assemblies, the specifications shall be compatible with, and inclusive of, all elements of the matrices required in CDRL #022, "Performance Verification Plan."

The specifications should clearly indicate the relationship to hardware maturity, such as qualification and acceptance. For multiple, identical items, indicate the specifications that apply to each.

CDRL NO. 308 (CONTINUED)

This specification shall include, as a minimum:

- a. Environmental test specification requirements
 - standard conditions for all test areas (temp., humidity, cleanliness)
 - qualification and acceptance test temperatures (incl uncertainties)
 - shock test requirements
 - radiation levels
 - acoustic excitation levels
 - qualification and acceptance vibration test levels
 - electromagnetic test levels
- b. Thermal and thermal vacuum test profiles for all components and subsystems in MODIS-N
- c. Instrument-level thermal balance and thermal test profiles
- d. Estimated test run time for each event
- e. Performance parameter accept/reject criteria
- f. Measurement tolerances for weight, center-of-gravity and moments-of-inertia

This shall be submitted in accordance with Part B (3XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

SOFTWARE ASSURANCE SPECIFICATIONS

2. CDRL No.:

309

3. Reference:MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
Table 4-1

4. Use:

Provide details for the MODIS-N assurance and build test programs.

5. Related Documents:

CDRL #006, 008, 017, 021, 026, 028, 032, 0033, 040, 303, 306, 402, 415

| CH-04

6. Preparation Information

These shall be prepared in accordance with NASA-DID-M400, "Assurance Plan" as defined in the MODIS-N Software Management Requirements (422-20-04). This shall be developed and delivered as part of the Assurance Plan (required in the MODIS-N Software Management Requirements (422-20-04) Table 4-1).

| CH-03

These shall be submitted in accordance with Part B (3XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

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- | | |
|-----------------------------------|---------------------|
| 1. <u>Title:</u> | 2. <u>CDRL No.:</u> |
| STANDARD PRACTICES AND PROCEDURES | 401 |
-
3. Reference:
- EOS Performance Assurance Requirements (420-05-01), Para. 1.3.2
-
4. Use:
- Supply additional detail for GSFC review in evaluating the contractor's system for product assurance (per the PAIP).
-
5. Related Documents:
- CDRL #006, 402, 502
-
6. Preparation Information
- Provide one copy of each individual procedure and/or documented instructions referenced in the PAIP.
- This shall be prepared in accordance with the EOS PAR (420-05-01).
- This shall be submitted in accordance with Part B (4XX Series) of this document.
- Revised or additional items after the contract award shall be submitted as generated.

DESCRIPTION OF REQUIRED DATA

1. Title:

SOFTWARE STANDARDS AND PROCEDURES

2. CDRL No.:402

3. Reference:MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
4.3.6, Table 4-1

4. Use:Supply additional information regarding new standards that have been
developed per the software management plan.

5. Related Documents:

CDRL #006, 008, 033, 040, 306, 309, 401, 415

| CH-04

6. Preparation InformationThese shall be prepared in accordance with NASA-DID-M200,
"Development Plan", section 3.1b "Development Engineering Standards"
and the MODIS-N Software Management Requirements
(422-20-04). This shall be developed and delivered as part of the
Development Plan (required in the MODIS-N Software Management
Requirements (422-20-04) Table 4-1).

| CH-03

These shall be submitted in accordance with Part B (4XX Series) of this
document.

DESCRIPTION OF REQUIRED DATA

1. Title:

DPA PROCEDURES

2. CDRL No.:403

3. Reference:EOS Performance Assurance Requirements (420-05-01), Para. 5.3.6

4. Use:

Provides information relative to actual Destructive Physical Analysis (DPA) of parts prior to implementation.

5. Related Documents:CDRL #006, 040, 209, 210, 211

6. Preparation Information:

These procedures shall be submitted for determination of its acceptability by GSFC if the contractor proposes to use a DPA procedure other than that in GSFC-S-311-70.

Define the requirements, procedures and rationale for the selected approach to any Destructive Physical Analysis (DPA) proposed for parts or components.

These shall be prepared in accordance with the EOS PAR (420-05-01).

These shall be submitted in accordance with Part B (4XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
OPERATIONAL IN-FLIGHT CALIBRATION PROCEDURES	404

3. Reference:

Statement of Work (422-20-03), Para. 2
MODIS-N Specification (422-20-02)

4. Use:

For conducting instrument calibration during in-orbit operation.

5. Related Documents:

CDRL #016, 018, 019, 025, 032, 101, 303, 305, 405, 410
EOS Calibration Management Plan (420-03-01)

6. Preparation Information:

These procedures shall describe the equipment, methods, accuracies, and command sequences for in-flight calibration. Fail-safe methods shall be used for conducting in-flight calibration.

These procedures shall be submitted in accordance with Part B (4XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

<u>1. Title:</u>	<u>2. CDRL No.:</u>
GENERAL OPERATING COMMAND PROCEDURES	405

3. Reference:

Statement of Work (422-20-03), Para. 4
 MODIS-N Specification (422-20-02)

4. Use:

For configuring MODIS-N in its operational modes

5. Related Documents:

CDRL #016, 025, 028, 032, 303, 404, 409, 411, 519

6. Preparation Information:

These procedures shall describe command sequences necessary to configure the instrument in any phase of any operational modes described in the specifications.

These procedures shall be submitted in accordance with Part B (4XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

TRANSPORTATION AND HANDLING PROCEDURES

2. CDRL No.:

406

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 8.21

| CH-07

4. Use:

Provide the instructions and procedures for safe and effective transporting and handling of MODIS-N and associated GSE throughout the mission contract.

5. Related Documents:

CDRL #006, 007, 020, 022, 024, 031, 032, 034, 308, 412

6. Preparation Information:

This documentation shall discuss all of the step-by-step procedures for the handling and transporting of MODIS-N, spares, and GSE. The documentation shall include:

- a. Nomenclature of all supportive equipment
- b. Calibration and load-tested data
- c. Identification of special environmental conditions, such as cleanliness, temperature, humidity, etc., and the controls to be implemented to maintain those conditions
- d. Format for recording QA stamp, deviations and approval columns
- e. Requirements for special tools, equipment, special handling fixture and containers
- f. Method of transportation and carrier
- g. Procedures to comply with local, state and federal safety requirements

CDRL NO. 406 (CONTINUED)

- h. **Procedures** for maintaining contract with the transported item (where applicable)

These shall be prepared in accordance with the EOS PAR (420-05-01).

These shall be submitted in accordance with Part B (4XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
STORAGE TESTING PROCEDURES	407

3. Reference:

Statement of Work (422-20-03), Para. 8
 MODIS-N Specification (422-20-02)
 EOS Performance Assurance Requirements (420-05-01), Para. 8.21

4. Use:

For defining procedures to be used for instrument storage testing.

5. Related Documents:

CDRL #007, 020, 024, 031, 032, 207, 221, 307, 409
 EOS General Instrument Interface Specification (420-03-02)

6. Preparation Information:

As a minimum, these procedures shall define the objectives, test requirements, test limits, test fixtures and instrumentation, handling procedures, environment, and test recording requirements.

These shall be prepared in accordance with the EOS PAR (420-05-01).

These shall be submitted in accordance with Part B (4XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:CONTROL OF UNSCHEDULED ACTIVITIES
(INTEGRATION/VERIFICATION TESTING)**2. CDRL No.:**408

3. Reference:EOS Performance Assurance Requirements (420-05-01), Para. 3.2.4

4. Use:Control, documentation, and approval of activities not part of an approved verification or calibration procedure so as to minimize their invalidation impact on testing.

5. Related Documents:CDRL #006, 020, 412

6. Preparation Information

This shall be developed based on the following:

- a. Awareness to hazard potential of last minute changes
- b. Prevention of accidents, injury or hardware damage
- c. Real-time decision making mechanisms to expedite continuation (or suspension) of testing after a malfunction

This **shall be prepared** in accordance with the EOS PAR (420-05-01) and **referenced** in the PAIP and in each verification procedure.

This shall be submitted in accordance with Part B (4XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
DETAILED TEST PROCEDURES	409

3. Reference:

Statement of Work (422-20-03), Para. 2
 MODIS-N Specification (422-20-02)

4. Use:

For defining test procedures for establishing Instrument and GSE compliance to MODIS-N specifications.

5. Related Documents:

CDRL #024, 029, 032, 034, 035, 207, 303, 305, 307, 405, 407, 410, 411
 EOS General Instrument Interface Specification (420-03-03)

6. Preparation Information:

As a minimum these procedures shall define the objectives, test requirements, test limits, test fixtures and instrumentation, handling procedures, environment, and test recording requirements.

These procedures shall be submitted in accordance with Part B (4XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
DETAILED GROUND CALIBRATION PROCEDURES	410

3. Reference:

Statement of Work (422-20-03), Para. 2
 MODIS-N Specification (422-20-02)
 EOS Calibration Management Plan (420-03-01), Para. 3

4. Use:

For calibrating the instrument performance in air or thermal vacuum.

5. Related Documents:

CDRL #018, 019, 032, 101, 303, 307, 404, 409

6. Preparation Information:

As a minimum these procedures shall define the objectives, test requirements and test limits, fixtures and test targets, source signal level and FOV requirements, optical interface requirements, and data recording and analysis requirements.

These procedures shall be submitted in accordance with Part B (4XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
GSE TEST PROCEDURES	411

3. Reference:

Statement of Work (422-20-03), Para. 9
MODIS-N Specification (422-20-02)

4. Use:

For testing the capability of the GSE to meet MODIS-N testing requirements.

5. Related Documents:

CDRL #029, 032, 034, 207, 303, 307, 405, 409
EOS General Instrument Interface Specification (420-03-02)

6. Preparation Information:

As a minimum, these procedures shall define the test requirements and test limits, the required performance and stability of measuring instrumentation, the instrumentation to be used, the procedure for determining suitability of thermal vacuum facilities, and signal source stability, and the required performance of data recorders.

These shall be submitted in accordance with Part B (4XX Series) of this document.

| CH-04

DESCRIPTION OF REQUIRED DATA

<p>1. <u>Title:</u></p> <p>PERFORMANCE VERIFICATION PROCEDURES</p>	<p>2. <u>CDRL No.:</u></p> <p>412</p>
<p>3. <u>Reference:</u></p> <p>EOS Performance Assurance Requirements (420-05-01), Para. 3.2.3</p>	
<p>4. <u>Use:</u></p> <p>Provide detailed procedures required to integrate MODIS-N into the observatory for each mission. Provide detailed procedures required to perform S/C system and laboratory tests.</p>	
<p>5. <u>Related Documents:</u></p> <p>CDRL #006, 007, 022, 032, 035, 106-109, 207, 208, 216, 307, 308, 406, 408 EOS General Instrument Interface Specification (420-03-02)</p>	
<p>6. <u>Preparation Information:</u></p> <p>These shall be prepared in accordance with the EOS PAR (420-05-01) and shall include, as a minimum:</p> <ol style="list-style-type: none"> Nomenclature and identification of the test article. Identification of test configuration and any differences from flight configuration Identification of objectives and criteria established for test by the applicable verification plan or specification. Where tests are run by computer program, the applicable test specification and computer program subroutine number must be identified Characteristics and design criteria to be inspected or tested, including values for acceptance and rejection, with actual date recorded Layout and interconnection of test equipment and articles including the grounding scheme. Location and identification of all measuring points on appropriate schematics and diagrams Procedures for maintaining contact with the transported item (where applicable) 	

| CH-04

CDRL NO. 412 (CONTINUED)

- f. **Description of integration tests planned for each subsystem, instrument and interrelationship verification testing**
- g. Planned use of GSE, breakout boxes, simulators, etc.
- h. Hazardous situations and operations and abort conditions
- i. Environmental and/or other conditions to be maintained, including contamination controls
- j. Environmental levels and tolerances
- k. Responsibilities and chain-of-command for test performance
- l. A tabulation of (1) all test target temperatures for all equipment in thermal vacuum, and (2) all predicted test temperatures for all equipment in thermal balance

These procedures shall be submitted in accordance with Part B (4XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

ASSEMBLY PROCEDURES

2. CDRL No.:413

3. Reference:

Statement of Work (422-20-03), Para. 11
MODIS-N Specification (422-20-02)

4. Use:

Provides methods to be used for assembling subsystems or the entire
MODIS-N instrument.

5. Related Documents:CDRL #020, 032, 414, 509, 519, 522

6. Preparation Information:

As a minimum, these procedures shall provide a top assembly view and an
"exploded view" of how the subsystem or subsystem components are
assembled to the next level; identify test measurements to be made and
recorded at different assembly levels, handling and environment
requirements, and photographic recording.

These shall be submitted in accordance with Part B (4XX Series) of this
document.

DESCRIPTION OF REQUIRED DATA

1. Title:

STANDARD REPAIR PROCEDURES

2. CDRL No.:

414

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 8.13.1.3

4. Use:

To provide information regarding repairs for MRB review and approval.

5. Related Documents:

CDRL #032, 034-035, 413, 510

6. Preparation Information:

These shall be developed in accordance with the EOS PAR (420-05-01).

These shall be submitted in accordance with Part B (4XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

<u>1. Title:</u>	<u>2. CDRL No.:</u>
SOFTWARE ASSURANCE SPECIFICATIONS	309

3. Reference:
 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3, Table 4-1

4. Use:
 Provide details for the MODIS-N assurance and build test programs.

5. Related Documents:
 CDRL #006, 008, 017, 021, 026, 028, 032, 0033, 040, 303, 306, 402, 415

| CH-04

6. Preparation Information
 These shall be prepared in accordance with NASA-DID-M400, "Assurance Plan" as defined in the MODIS-N Software Management Requirements (422-20-04). This shall be developed and delivered as part of the Assurance Plan (required in the MODIS-N Software Management Requirements (422-20-04) Table 4-1).
 These shall be submitted in accordance with Part B (3XX Series) of this document.

| CH-03

DESCRIPTION OF REQUIRED DATA

<p>1. <u>Title:</u></p> <p>SOFTWARE TEST PROCEDURES</p>	<p>2. <u>CDRL No.:</u></p> <p>415</p>
<p>3. <u>Reference:</u></p> <p>EOS Performance Assurance Requirements (420-05-01), Para. 10.2.2</p>	
<p>4. <u>Use:</u></p> <p>To define the software test procedures.</p>	
<p>5. <u>Related Documents:</u></p> <p>CDRL #006, 008, 017, 021, 022, 217, 306, 309, 402</p>	
<p>6. <u>Preparation Information:</u></p> <p>These software test procedures shall be prepared that implement the software test plans required in accordance with the EOS PAR (420-05-01), paragraph 10.2.1. These software test procedures shall be prepared in accordance with NASA-DID-A200, "Test Procedures".</p> <p>These shall be submitted in accordance with Part B (4XX Series) of this document.</p>	

CH-03

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
AUDIT PROGRAM DESCRIPTION	501
3. <u>Reference:</u>	
EOS Performance Assurance Requirements (420-05-01), Para. 1.9, 1.9.1	
4. <u>Use:</u>	
Evaluation of contractor and subcontractor compliance with all provisions of the Implementation Plan and the provisions of the procurement documents.	
5. <u>Related Documents:</u>	
CDRL #001, 006, 203-205	
6. <u>Preparation Information</u>	
The contractor's schedule and conduct of the audits shall be based on the following:	
<ul style="list-style-type: none"> a. Criticality of items being procured, or those items identified by failure mode, effects, and criticality analyses, or information from trend analyses b. Known problems or difficulties c. Supplier quality history d. Remaining period of supplier performance 	
The audit program for the contractor, subcontractors, and suppliers shall be defined in the PAIP and shall be prepared in accordance with the EOS PAR (420-05-01).	

| CH-04

CDRL NO. 501 (CONTINUED)

Each **audit** shall include examination of operations and documents as well as examinations of articles and materials.

This shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
RESERVED/DELETED	502

3. Reference:
N/A

4. Use:
N/A

5. Related Documents:
N/A

6. Preparation Information:
N/A

CH-01

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
WEIGHT AND POWER BUDGETS	503

3. Reference:

Statement of Work (422-20-03), Para. 2
MODIS-N Specification (422-20-02)

4. Use:

For tracking instrument weight and power requirements.

5. Related Documents:

CDRL #016, 029, 032, 206, 207, 220

6. Preparation Information:

Information to be provided shall differentiate between calculated, estimated, or actual values for both weight and power. The values to be presented shall be at least to the major component level of the subsystems, e.g., mechanism, power supplies, heaters, cabling, etc. The accuracy of the values presented shall be identified.

These shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

LIMITED LIFE ITEMS LIST

2. CDRL No.:

504

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 7.4

4. Use:

Provides data on limited life items or items subject to degradation with age used on MODIS-N for GSFC to review and approve acceptability for implementation and for flight.

5. Related Documents:

CDRL #006, 016, 020, 526

6. Preparation Information:

Prepare the list and related information for each mission in accordance with the EOS PAR (420-05-01).

The list shall include the expected life and the rationale for the selection of each item.

The list shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
NON-STANDARD PARTS DATA PACKAGE	505
3. <u>Reference:</u>	
EOS Performance Assurance Requirements (420-05-01), Para. 5.3.2.1	
4. <u>Use:</u>	
Provides data for non-standard part selection for GSFC review leading to approval or disapproval.	
5. <u>Related Documents:</u>	
CDRL #006, 202, 204, 218, 301, 526-528	
6. <u>Preparation Information:</u>	
Complete a separate Non-standard Part Approval Request (NSPAR) for each non-standard part type proposed for use on MODIS-N. Submit this data on Form GSFC 4-15 in accordance with the instructions on the back of the form.	
This shall be prepared in accordance with the EOS PAR (420-05-01).	
This shall be submitted in accordance with Part B (5XX Series) of this document.	

DESCRIPTION OF REQUIRED DATA

1. Title:MATERIALS LIST, LUBRICATION LIST, AND
PROCESS LIST**2. CDRL No.:**506

3. Reference:EOS Performance Assurance Requirements (420-05-01), Para. 6.4

4. Use:Provides data on materials, lubricants and processes for review and
approval by GSFC.

5. Related Documents:CDRL #006, 016, 020, 202, 218, 301, 304, 526, 527

6. Preparation Information:The following lists may be in the contractor's format. They shall include all of
the information required by both sides of the GSFC form identified with each
list.

- a. Inorganic Materials List, GSFC Form 18-59A
- b. Polymeric Materials List, GSFC Form 18-59B
- c. Lubrication List, GSFC Form 18-59C
- d. **Materials Processes List, GSFC Form 18-59D**

These shall be prepared in accordance with the EOS PAR (420-05-01).

These shall be submitted in accordance with Part B (5XX Series) of this
document.

DESCRIPTION OF REQUIRED DATA

1. Title:

CRITICAL ITEMS LIST (CIL)

2. CDRL No.:507

3. Reference:EOS Performance Assurance Requirements (420-05-01), Para. 7.3.1

4. Use:

Provides information relative to failure modes that present potential catastrophic or critical effects on the mission as well as information on EEE parts applications that fail to meet the derating criteria.

5. Related Documents:CDRL #006, 016, 020, 108, 526

6. Preparation Information:

This shall be prepared in accordance with the EOS PAR (420-05-01) and shall include, as a minimum:

- a. Potential catastrophic failures that can't be eliminated from the system
- b. All potential critical/major failures
- c. All part applications that don't conform with derating policy
- d. **Justification** for retention of each item listed

This **shall be** submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>	CH-03
ACQUISITION ACTIVITIES PLAN	508	
3. <u>Reference:</u>		
MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3, Table 4-1		
4. <u>Use:</u>		
Define contractor activities required to acquire necessary components and to specify management and assurance requirements.		
5. <u>Related Documents:</u>		
CDRL #008, 009, 017, 021, 040		CH-04
6. <u>Preparation Information:</u>		
This shall be prepared in accordance with NASA-DID-M100, "Acquisition Activities Plan" and the MODIS-N Software Management Requirements (422-20-04).		CH-03
This shall be submitted in accordance with Part B (5XX Series) of this document.		

DESCRIPTION OF REQUIRED DATA

1. Title:

APPROVED OR CONTROLLED DRAWINGS

2. CDRL No.:509

3. Reference:

Statement of Work (422-20-03), Para. 1
 MODIS-N Specification (422-20-02)
 EOS Configuration Management Plan (420-02-02), Figure 3-1
 EOS General Instrument Interface Specification (420-03-02), Para. 1.1.3

| CH-07

4. Use:

For evaluating and record keeping of MODIS-N development.

5. Related Documents:

CDRL #016, 020, 032, 302, 413, 515-519

6. Preparation Information:

As a minimum, this information shall consist of all drawings approved by the Contractor Program Manager and drawings that are under configuration control. At least one drawing shall be in a reproducible format.

| CH-06

These drawings shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

<u>1. Title:</u>	<u>2. CDRL No.:</u>
MATERIAL REVIEW BOARD WAIVER/DEVIATION REQUESTS	510

3. Reference:
 EOS Performance Assurance Requirements (420-05-01), Para. 4.8, 8.13.1.3
 EOS Configuration Management Plan (420-02-02), Para. 4.8

| CH-04

4. Use:
 Provides for the submission of waiver/deviation requests to GSFC for any repair or use-as-is recommendations that will adversely affect the safety, reliability, durability, performance, interchangeability, weight, etc. of the hardware.

5. Related Documents:
 CDRL #005, 006, 016, 203, 210, 414, 511-513

| CH-04

6. Preparation Information:
 These shall be prepared in accordance with the EOS PAR (420-05-01).
 Submit waiver and deviation requests to the Project in accordance with the EOS Configuration Management Plan (420-02-02) and Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
SAFETY WAIVER REQUESTS	511

3. Reference:
 EOS Performance Assurance Requirements (420-05-01), Para. 4.8

| CH-04

4. Use:

Initiate formal request for customer acceptance of safety risks that have not been or cannot be eliminated.

5. Related Documents:

CDRL #005, 006, 016, 203, 210, 510

6. Preparation Information:

These shall be prepared in accordance with the EOS PAR (420-05-01) and shall include, as a minimum:

- a. Requirement that can't be met
- b. Reason it can't be met
- c. Proposed method for controlling the additional risk
- d. Residual risk after application of the additional controls

Each **waiver** request shall address only one hazard.

These **shall** be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

CONFIGURATION CHANGE REQUESTS
(CLASS I)

2. CDRL No.:

512

3. Reference:

EOS Configuration Management Plan (420-02-02) Figure 4.2.1, Para. 4.2.1,
4.3.1
MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
4.5, Table 4-1

4. Use:

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.

5. Related Documents:

CDRL #005, 108, 110, 203, 510, 513

6. Preparation Information:

Consistent with the Configuration Management Plan (CMP), the contractor 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 CMP and shall be reviewed and approved by appropriate levels of the Configuration Control Board (CCB).

These shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
CONFIGURATION CHANGE REQUESTS (CLASS II)	513

3. Reference:

EOS Configuration Management Plan (420-02-02) Para. 4.2.1, 4.3.1,
Figure 3-1
MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
4.5, Table 4-1

4. Use:

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.

5. Related Documents:

CDRL #005, 203, 510, 512

6. Preparation Information:

Consistent with the CMP, the contractor shall prepare Class II Change Requests for all changes that are not Class I criteria and that are not detrimental to the Government. These changes shall be submitted to the CCB for classification concurrence.

Information copies shall be sent to the EOS CMO.

The standard CCR Form shall be used.

These shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
SOFTWARE DISCREPANCY REPORTS	514

3. Reference:

MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3, 4.2.6, Table 4-1

4. Use:

Indicates discrepancy to either a software or firmware product with regards to the applicable requirements, standards, or procedures.

5. Related Documents:

CDRL #008, 021, 026, 028, 040, 209, 212

| CH-04

6. Preparation Information:

Develop in accordance with the requirements defined in NASA-DID-M600, "Configuration Management Plan", and the MODIS-N Software Management Requirements (422-20-04). These shall be prepared in accordance with NASA-DID-R004, "Discrepancy (NRCA) Report".

These shall be submitted in accordance with Part B (5XX Series) of this document.

| CH-03

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
DRAWING TREE	515
3. <u>Reference:</u>	
Statement of Work (422-20-03), Para. 1 MODIS-N Specification (422-20-02) EOS Configuration Management Plan (420-02-02), Figure 3-1	
4. <u>Use:</u>	
For ready reference list of all MODIS-N instrument and GSE drawings.	
5. <u>Related Documents:</u>	
CDRL #016, 020, 032, 301, 302, 509, 516-519	
6. <u>Preparation Information:</u>	
The drawing tree is a list of all drawings for the MODIS-N instrument and GSE. The instrument and GSE shall have separate drawing trees. The drawing trees shall be organized and identified to serve as a ready reference list. The drawings shall be identified by name and number.	
This shall be submitted in accordance with Part B (5XX Series) of this document.	

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
INSTRUMENT INTERFACE DESCRIPTION DOCUMENT	516

3. Reference:

Statement of Work (422-20-03), Para. 2
MODIS-N Specification (422-20-02)

| CH-07

4. Use:

For controlling the interface between the instrument and spacecraft.

5. Related Documents:

CDRL #016, 020, 032, 302, 307, 509, 515, 517-519

6. Preparation Information:

This document shall identify the instrument to spacecraft interface in all technical areas, e.g., optical, thermal, mechanical, structural, view factors, etc. The electrical interface shall define both sides of the interface.

This document shall be prepared in accordance with the requirements stated in the EOS General Instrument Interface Specification (420-03-02).

This shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
DRAWING BOOKS	517

3. Reference:

Statement of Work (422-20-03), Para. 2
 MODIS-N Specification (422-20-02)
 EOS Configuration Management Plan (420-02-02), Figure 3-1

4. Use:

For testing and trouble-shooting of MODIS-N and GSE.

5. Related Documents:

CDRL #016, 020, 032, 302, 307, 509, 515, 516, 518, 519

| CH-04

6. Preparation Information:

Drawing books are three-ring binder books (B-sized) containing all major drawings, particularly wiring diagrams, schematics, command lists and functions, etc. These books shall provide a "portable drawing file" for use in testing and trouble-shooting the operation of MODIS-N and associated GSE.

These shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
INDENTURED DRAWING LIST	518
3. <u>Reference:</u>	
Statement of Work (422-20-03), Para. 1 MODIS-N Specification (422-20-02) EOS Configuration Management Plan (420-02-02), Figure 3-1	
4. <u>Use:</u>	
Reference of all MODIS-N Technical information.	
5. <u>Related Documents:</u>	
CDRL #016, 020, 032, 302, 509, 515-517, 519	
6. <u>Preparation Information:</u>	
This includes a listing of all MODIS-N Program Specifications, Drawings, Tests, Procedures, etc.	
This list shall be submitted in accordance with Part B (5XX Series) of this document.	

| CH-04

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
MODIS-N TECHNICAL DESCRIPTION DOCUMENT	519

3. Reference:
Statement of Work (422-20-03), Para. 2

4. Use:
Provide understanding of Instrument Configuration and GSE, operation, and test results to those not directly involved in the MODIS-N development.

5. Related Documents:
CDRL #032, 226, 302, 303, 305, 405, 413, 509, 515-518

6. Preparation Information:

This document shall describe the MODIS-N instrument system and subsystems, the GSE, and the instrument to spacecraft interface. Test information, sensitivities and calibration results shall be included.

The document is not meant to be an engineering working document but a reference document for Government personnel, scientists, and spacecraft contractor personnel. The report shall be prepared in accordance with S-250-P-1C (Type III). A draft copy shall be submitted for approval by the Technical Officer before printing.

This shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
RESERVED	520

3. Reference:
N/A

4. Use:
N/A

5. Related Documents:
N/A

6. Preparation Information:
N/A

DESCRIPTION OF REQUIRED DATA

1. Title:

WEEKLY STATUS REPORTS

2. CDRL No.:521

3. Reference:Statement of Work (422-20-03), Para. 1
MODIS-N Specification (422-20-02)

4. Use:Contract status evaluation.

5. Related Documents:

CDRL #203, 529, 530, 540

| CH-04

6. Preparation Information:

On Monday of each week the contractor shall telefax to the Technical Officer a written report indicating the status of the contract as of close of business the preceding Friday, including a summary of progress made. This report shall include, but not necessarily be limited to the following, as required:

- a. Technical progress, including significant accomplishments and milestones reached
- b. Problems encountered and proposed corrective action
- c. Any actual or anticipated slip in schedule
- d. Identification of any Class I or Class II changes

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

These shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

PHOTOGRAPHIC RECORDS

2. CDRL No.:

522

3. Reference:

Statement of Work (422-20-03), Para. 1, Clause H.12

4. Use:

Program status reviews; system, subsystem, and component packaging evaluations; and trouble shooting.

5. Related Documents:

CDRL #413

6. Preparation Information:a. Still Photography

Pictures shall be made at appropriate points in the development of MODIS-N. Pictures shall be made of the major subsystems, critical components, the full-up system, and major GSE items. These pictures shall be in color and measure 8 X 10 inches. The pictures shall serve as a record of the build-up of a major component or subsystem; e.g., a typical electronic card, mother board, electronic subsystem with cover off, etc. Pictures of environmental test fixtures shall also be provided. Hard copies and negatives of each picture shall be provided. The contractor should plan on at least 50 pictures of individual items, and 10 copies of each item except for the full-up system which shall require 20 copies of each flight model and the Engineering model.

b. Motion Picture Photography

16-mm footage, color

Minimum TBD feet, Maximum TBD feet

Where practical, video tape (1/2 inch VHS format) may be used in lieu of motion picture film.

DESCRIPTION OF REQUIRED DATA

-
- | | |
|---|---------------------|
| 1. <u>Title:</u> | 2. <u>CDRL No.:</u> |
| PERFORMANCE MEASUREMENT STATUS
REPORT (PMSR) | 523 |
-
3. Reference:
- Contact Clause H.4
EOS Configuration Management Plan (420-02-02), Figure 3-1, Para. 5.6, 5.7
-
4. Use:
- PMSR data shall be used by GSFC system managers to: (1) evaluate contract performance, (2) identify the magnitude and impact of actual and potential program areas causing significant cost and schedule variances, and (3) provide valid, timely program status information to higher authorities.
-
5. Related Documents:
- CDRL #001, 003, 004, 204
-
6. Preparation Information:
- This is prepared in accordance with the Performance Measurement System (PMS) Handbook, Section 4. This handbook is Attachment M to the RFP document.
- This shall be submitted in accordance with Part B (5XX Series) of this document.

| CH-04

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
MATERIAL USAGE AGREEMENT/STRESS CORROSION EVALUATION	524
3. <u>Reference:</u>	
EOS Performance Assurance Requirements (420-05-01), Para. 6.4	
4. <u>Use:</u>	
Provide data on material usage, proposed for use on MODIS-N, for GSFC review and approval, when use of a non-compliant material is requested.	
5. <u>Related Documents:</u>	
CDRL #301 EOS General Instrument Interface Specification (420-03-02)	
6. <u>Preparation Information</u>	
The contractor is allowed to utilize his own reporting system in accordance with the guidelines in the EOS PAR (420-05-01). The contractor shall provide all information requested (per MSFC Spec 522). and shall receive approval from the contracting officer.	
This data is also to be supplied on a magnetic medium as an ASCII file (w/ hardcopy documentation of file structures and file names). The required medium is floppy disk(s) compatible with IBM-PC DOS or MS DOS.	
This shall be submitted in accordance with Part B (5XX Series) of this document.	

| CH-04

DESCRIPTION OF REQUIRED DATA

1. Title:

AS-BUILT MATERIALS LIST

2. CDRL No.:525

3. Reference:EOS Performance Assurance Requirements (420-05-01), Para. 6.4

4. Use:

Provide data on as-built material usage, proposed for use on MODIS-N, for GSFC review and approval.

5. Related Documents:CDRL #029, 202, 301, 526

6. Preparation Information

The contractor is allowed to utilize his own reporting system in accordance with the guidelines in the EOS PAR (420-05-01). The contractor shall provide all information requested via the GSFC forms and shall receive approval from the contracting officer.

This list is also to be supplied on a magnetic medium as an ASCII File (w/ hardcopy documentation of file structures and file names). The required medium is floppy disk(s) compatible with IBM-PC and MS DOS.

This shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

ACCEPTANCE DATA PACKAGE

2. CDRL No.:

526

3. Reference:EOS Performance Assurance Requirements (420-05-01), Para. 8.16,
8.23

| CH-04

4. Use:To ensure that the deliverable contract end-items are in accordance with
contract requirements prior to NASA acceptance.

5. Related Documents:

CDRL #006, 104, 215, 224, 226, 301, 305, 504-507, 525, 527, 528

6. Preparation InformationThis acceptance data package shall be prepared in accordance with the
EOS PAR (420-05-01) and shall be comprised of the following, as a
minimum:

- a. As-built configuration list
- b. Hardware parts lists
- c. Hardware materials and processes lists
- d. **Test Log Book** (including total operating time and cycle records)
- e. **Open item lists** (including reasons for being open)
- f. Safety compliance data package
- g. Limited life items listings and status
- h. Critical parameters trend data
- i. Final comprehensive performance test results

CDRL NO. 526 (CONTINUED)

This acceptance data package shall be submitted in accordance with Part B (5XX Series) of this document with an additional copy accompanying each end-item.

DESCRIPTION OF REQUIRED DATA

1. Title:

AS-DESIGNED PARTS LIST

2. CDRL No.:

527

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 5.5.1

4. Use:

Provides a complete list of as-designed parts, planned for MODIS-N use, for review by GSFC.

5. Related Documents:

CDRL #006, 016, 301, 505, 506, 526, 528

6. Preparation Information:

Each as-designed parts list shall be a composite of the parts selections for each circuit design in the component. The parts lists shall be updated as the design definition evolves prior to the system Preliminary Design Review (PDR) and shall be updated a second time prior to system Critical Design Review (CDR) to reflect further design changes and refinements. The list shall be placed under configuration control at the time of CDR and be updated as further design changes are approved for the system. As a minimum, each as-designed list shall contain the following information:

- a. Part number proposed
- b. Part specification control drawing number
- c. Common designator or generic number
- d. Name or Commercial and Government Entity (CAGE) Code of the part manufacturer or proposed manufacturer
- e. Quantity used
- f. Drawing number of component to which the list pertains

CDRL NO. 527 (CONTINUED)

- g. Nonstandard part approval request number and status
- h. Applicable waivers/deviations
 - i. Indication that any data for the line item has changed since the previous parts list submission
 - j. Critical application designator

This list shall be prepared in accordance with the EOS PAR (420-05-01).

This list shall be submitted in accordance with Part B (5XX Series) of this document. A separate list shall be submitted for each component.

This data is also to be supplied on a magnetic medium as an ASCII File (w/ hardcopy documentation of file structures and file names). The required medium is floppy disk(s) compatible with IBM-PC and MS DOS, as well as 1600 bpi unlabeled magnetic tapes.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
AS-BUILT PARTS LIST	528

3. Reference:

EOS Performance Assurance Requirements (420-05-01), Para. 5.5.2

4. Use:

Provides data on as-built parts for GSFC review leading to approval or disapproval.

5. Related Documents:

CDRL #006, 029, 301, 505, 526, 527

6. Preparation Information:

The as-built parts list for each component shall be submitted prior to NASA acceptance of each contract end item as part of the end-item data package. It may be submitted either as a collection of lists for the components making up the end item or as a single composite list. As a minimum, each line item on the parts list(s) shall contain the following information:

- a. Part number used
- b. Part specification control drawing number
- c. Common designator or generic number
- d. Part designation marked on the part
- e. Part manufacturer or CAGE code
- f. Lot date code/serial number
- g. Circuit designator
- h. Drawing number of subassembly in which used (or lowest assembly level on which the part is called out)

CDRL NO. 528 (CONTINUED)

- i. Drawing number of component in which used or to which the list pertains
- j. Applicable waivers/deviations
- k. Indication that any data for the line item has changed since the previous as-designed parts list submission
- l. Critical application designator

This list shall be prepared in accordance with the EOS PAR (420-05-01).

This list shall be submitted in accordance with Part B (5XX Series) of this document.

This data is also to be supplied on a magnetic medium as an ASCII File (w/ hardcopy documentation of file structures and file names). The required medium is floppy disk(s) compatible with IBM-PC and MS DOS, as well as 1600 bpi unlabeled magnetic tapes.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
REPORTS OF WORK	529
3. <u>Reference:</u>	
Contract Clause C.2 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3, 4.2.4, 4.2.6, Table 4-1	
4. <u>Use:</u>	
Provides status of contractor work efforts on monthly and quarterly basis.	
5. <u>Related Documents:</u>	
CDRL #521, 541, 543	
6. <u>Preparation Information:</u>	
These shall be prepared in accordance with Contract Clause C.2.	
These shall be submitted in accordance with Part B (5XX Series) of this document.	

| CH-04

DESCRIPTION OF REQUIRED DATA

1. Title:MATERIAL INSPECTION AND RECEIVING
REPORT (DD250)2. CDRL No.:

530

3. Reference:

Contract Clause E.2

4. Use:

Provides inspection and receiving acknowledgement.

5. Related Documents:

CDRL #521

| CH-04

6. Preparation Information:

This shall be prepared in accordance with Contract Clause E.2.

This shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
DOD INDUSTRIAL PLANT EQUIPMENT REQUISITION (DD FORM 1419)	531

3. Reference:

Contract Clause G.9

4. Use:

To request EVS screening of centrally reportable equipment.

5. Related Documents:

None

6. Preparation Information:

This shall be prepared in accordance with the instructions for DD Form 1419.

This shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
DOD PROPERTY RECORD (DD 1342)	532
3. <u>Reference:</u>	
Contract Clause G.9 NASA FAR Supplement Clause 18.52.245-70, "Acquisition of Existing Government Equipment"	
4. <u>Use:</u>	
Records receipt of and major changes to government owned property.	
5. <u>Related Documents:</u>	
CDRL #533	
6. <u>Preparation Information:</u>	
This shall be prepared in accordance with Contract Clause G.9.	
Use DD Form 1342, "Centrally Reportable Equipment".	
Submit within 15 days of receipt and acceptance of new equipment or when major changes to status occur in accordance with Part B (5XX Series) of this document.	

DESCRIPTION OF REQUIRED DATA

1. Title:

ANNUAL REPORT OF GOVERNMENT-OWNED/
CONTRACTOR-HELD PROPERTY

2. CDRL No.:

533

3. Reference:

Contract Clause G.10
Deliverable Item E1

4. Use:

Used to track and locate government-owned property.

5. Related Documents:

CDRL #001, 532

6. Preparation Information:

Prepare in accordance NASA FAR supplement clause 18-52.245-73
Financial Reporting of Government Owned Contractor held Property.

Use NASA Form 1018.

Deliver no later than July 31 each year.

This shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

MONTHLY AND QUARTERLY CONTRACTOR
FINANCIAL MANAGEMENT REPORT (NASA
FORM 533M/533Q)

2. CDRL No.:

534

3. Reference:

Contract Clauses H.3 and I.11

4. Use:

For financial analysis.

5. Related Documents:

CDRL #541, 543
Contractor Financial Management Reports
NASA Form 533M and 533Q
Work Breakdown Structure (422-20-01)

| CH-04

6. Preparation Information:

See Clause H.3, Monthly and Quarterly Contractor Financial Management Reports (NASA Forms 533M and 533Q), for instructions and distribution.

This shall report direct labor hours and elements of cost (actual and plan).

This shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

SUBCONTRACTING REPORT FOR INDIVIDUAL
CONTRACTS (STANDARD FORM 294)

2. CDRL No.:

535

3. Reference:

Contract Clause H.7

4. Use:

To report on subcontracting goals.

5. Related Documents:

CDRL #011, 536, 537

| CH-04

6. Preparation Information:

Prepare in accordance with Standard Form 294 instructions.

These shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

SUMMARY SUBCONTRACTING REPORT
(STANDARD FORM 295)

2. CDRL No.:

536

3. Reference:

Contract Clause H.7

4. Use:

To report on subcontracting goals.

5. Related Documents:

CDRL#011, 535, 537

6. Preparation Information:

Prepare in accordance with Standard Form 295 instructions.

This shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
REPORT ON NASA SUBCONTRACTS (NASA FORM 667)	537

3. Reference:

Contract Clause I.10

4. Use:

To provide information on subcontracts to NASA.

5. Related Documents:

CDRL #535-536

6. Preparation Information:

Preparation in accordance with NASA Form 667 instructions and NASA FAR Supplement Clause 18-52.204.70.

This shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. Title:

INTERMEDIATE LOGIC NETWORK DIAGRAMS

2. CDRL No.:

538

3. Reference:

Statement of Work (422-20-03), Para I, II, and 1 thru 12
 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3,
 4.2.4

4. Use:

Provide a geometric layout of each subsystem

5. Related Documents:

CDRL #001, 003, 004, 008, 014, 015, 036, 037, 523, 539-543

CH-04

6. Preparation Information

Intermediate Logic Networks shall be developed for each subsystem. These networks shall be the geometric layout of the schedule baseline and the performance baseline will be compared to the schedule baseline for monitoring the progress of work.

These networks will reflect the major events i.e., design, fabrication, assembly and acceptance tests. These networks will be sufficient detail to allow adequate monitoring of the work. Upon request from the Government, the Contractor shall supply the Government with more information from the detail schedules, which the Contractor maintains.

These detail schedules should be verified with the intermediate schedules at regular intervals to ensure that all changes are rolled up from lower level (detail) schedules to the intermediate level schedules.

CDRL NO. 538 (CONTINUED)

The **Performance Measurement system (PMS)** requires that vertical **traceability** can be performed/demonstrated from the **Work Breakdown Structure (WBS)** element where earned value is taken to the Intermediate Schedules. Horizontal traceability will be performed/demonstrated for those "hand offs" from one subsystem to another subsystem.

Each event will contain the following data:

1. Event number relating to the WBS
2. Current expect start/completion dates
3. Number of work days required to complete task
4. Amount of float/slack in work days
5. Description of event
6. Baseline start/completion dates

These shall be submitted in accordance with Part B (5XX Series) of this document.

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DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u> INTERMEDIATE BAR CHARTS	2. <u>CDRL No.:</u> 539
3. <u>Reference:</u> Statement of Work (422-20-03), Para. I, II, and 1 thru 12 MODIS-N Software Management Requirements (422-20-04), Para. 4.1.3, 4.2.4	
4. <u>Use:</u> To provide graphical charts of schedule and performance baseline information from Intermediate Logic Network Diagrams	
5. <u>Related Documents:</u> CDRL #001, 003, 004, 008, 014, 015, 036, 037, 523, 538, 540-543	
6. <u>Preparation Information:</u> The information contained in the Intermediate Logic Network Diagrams shall also be furnished on 8 1/2" x 11" bar chart format. Automated scheduling systems have the capability of providing both logic networks and bar charts. These bar charts are not required to show the interrelationship between events. This shall be submitted in accordance with Part B (5XX Series) of this document.	

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DESCRIPTION OF REQUIRED DATA

1. Title:

TABULAR REPORTS

2. CDRL No.:540

3. Reference:Statement of Work (422-20-03), Para. II Section 1

4. Use:To provide a report of all events and milestone in a tabular format

5. Related Documents:CDRL #036, 037, 523, 538, 539, 542, 543

CH-04

6. Preparation Information:

The Contractor shall submit a Tabular Report with the primary sort on the event number for the same data as reflected in the Intermediate Schedules.

This report will contain all events/milestones contained in the scheduling data base. This listing shall contain the start/completion date, number of work days required to complete the task, amount of float/slack in work days, description of event/milestone, and the baseline start/completion date for each event.

This shall be submitted in accordance with Part B (5XX Series) of this document.

DESCRIPTION OF REQUIRED DATA

1. <u>Title:</u>	2. <u>CDRL No.:</u>
WORK PACKAGES/SCHEDULING SYSTEM CROSS REFERENCE GUIDE	541

3. Reference:

Statement of Work (422-20-03), Para. II Section 1

4. Use:

To provide traceability of the work packages respective to the scheduling system

5. Related Documents:

CDRL #004, 015, 036, 037, 529, 534, 538, 539

6. Preparation Information:

This document shall provide the traceability between the contractors work package planning sheets and events contained in the automated scheduling system. This document should have the capability for producing a summary of all job numbers (work packages) associated with a particular event in the scheduling system. This deliverable item is the major link between the cost control function and the scheduling system.

This shall be submitted in accordance with Part B (5XX Series) of this document.

CH-04

DESCRIPTION OF REQUIRED DATA

1. Title:

END ITEM FLOAT REPORT

2. CDRL No.:

542

3. Reference:

Statement of Work (422-20-03), Para. II Section 1

4. Use:

To provide a monthly update of deliverable items

5. Related Documents:

CDRL # 036, 037, 538, 539, 540, 543

CH-04

6. Preparation Information:

This monthly report shall be submitted reflecting the End Item Float for each deliverable i.e., the Power Control unit delivered to Integration and Test.

This report shall compare the current month float to float of the previous month and changes will be explained. This report shall contain the following information:

Event Number:	The appropriate event number in the scheduling system.
Description:	The name of the deliverable item
Current Month Float:	Float will be reflected in the number of work days for the current month

CDRL NO. 542 (CONTINUED)

Previous Month Float: Float will be reflected in the number of work days for the previous month

Reason: All changes to the float from the previous month to the current month will be explained.

This shall be submitted in accordance with Part B (5XX Series) of this document.

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DESCRIPTION OF REQUIRED DATA

1. Title:

MONTHLY SCHEDULE VARIANCE ANALYSIS

2. CDRL No.:

543

3. Reference:

Statement of Work (422-20-03), Para. II Section 1
 MODIS-N Software Management Requirements (422-20-04), Para. 4.2.4

4. Use:

To provide a monthly analysis of the program

5. Related Documents:

CDRL #001, 003, 004, 015, 036, 037, 523, 529, 530, 534, 538-540, 542

CH-04

6. Preparation Information:

A monthly analysis shall also be submitted for each major subsystem. This will contain a brief description of the current status and existing or potential problems will be addressed. The primary critical path will be explained along with possible work-around techniques being considered to maintain schedule integrity.

A manual (art) type chart reflecting the primary critical path shall be submitted on 8 1/2" x 11" paper suitable for making into viewgraphs.

This shall be submitted in accordance with Part B (5XX Series) of this document.