

/Spacecraft

Spacecraft CDRL

417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)

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SCCDRL1	1	1 Introduction
SCCDRL2	1.0-1	This Contract Data Requirements List (CDRL) Document defines the requirements for deliverable data to be provided by the Spacecraft contract. Section 1.1 includes definitions and instructions for distribution. Section 2 presents the CDRL item by item with due dates and delivery instructions. Section 3.0 provides the Data Item Description (DID), as description of each item and describes use and preparation information.
SCCDRL3	1.1	1.1 Submission Definition
SCCDRL4	1.1.0-1	Unless otherwise noted, the data in the due date column titled “days” are to be interpreted as calendar days.
SCCDRL5	1.1.0-2	<p>Action Required shall be:</p> <p>A - Approval - Documents in this category require receipt by the GOES R Project within the time specified and written approval prior to Contractor implementation.</p> <p>Requirements for resubmission will be as specified in letter(s) of disapproval. The GOES R Project will act on items requiring approval within fourteen days of receipt of the item.</p> <p>R - Review - Documents in this category will be received by the GOES R Project within the time period specified, and will be subject to evaluation.</p> <p>These documents will be implemented upon issuance unless otherwise noted.</p> <p>However, when an evaluation reveals inadequacies in a document, the Contractor will correct the document as required</p> <p>I - Information - Documents in this category will be used by the GOES R Project to determine current project status and progress and for future planning requirements.</p>
SCCDRL11	1.1.0-3	<p>Frequency</p> <p>The Frequency for the data submission will be identified by one of the following items: Weekly (W), Bi-weekly (BW), Off Bi-Weekly (OBW), Monthly (M), Bi-Monthly (BM), Quarterly (Q), Annually (A), As Required (AR), As Generated (AG), See DID, Launch Readiness Date (LRD).</p>
SCCDRL12	1.1.0-4	Electronic media as agreed to by Government and Contractor, A softcopy of the CDRL item and Contractor transmittal letter shall be submitted electronically to the government via the agreed upon portal.
SCCDRL114 1	1.1.0-5	All electronic deliverables shall contain scanned copy of Contractor signature and date signed. Other delivery methods may be required as detailed in the data item descriptions or by the COTR or CO.
SCCDRL14	1.1.0-6	<p>Delivery Instructions</p> <p>Delivery of all items shall be to the GOES-R Portal</p> <p>In addition, the contractor shall deliver hardcopies of the FM-02 and FM-03 CDRL items to:</p> <p style="padding-left: 40px;">Ms. Clelia A Walker Contracting Officer Goddard Space Flight Center</p>

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SCCDRL14	1.1.0-6	Building 6 Room S138 Mailstop 417 Greenbelt, MD 20771 Clelia.A.Walker@nasa.gov Business phone 301 286-1351 Fax number 301 286-9319

Delivery of all hardcopies as described in the following Data Item Descriptions **shall** be to:

Observatory Manager
GOES R Project Documentation Control Center, Code 417
Building 6 Room S133
Goddard Space Flight Center
Greenbelt, MD 20771

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SCCDRL16 2

2 Spacecraft Contract Data Requirements List (CDRL)

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Program Management DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
PM-01	Program Management Plan	Initial: 30 DACA	R
PM-02	Contractor's WBS Dictionary	Frequency: AG Initial: 14 DACA	A
PM-03	NASA Property in the Custody of the Contractors	Frequency: Annually by Oct 15 Initial: 60 DACA Final: @ Contract End	R
PM-04	Small Business Subcontracting Plan	Frequency: AR Initial: Proposal	A
PM-05	Small Business Subcontracting Plan Reports	Initial: Per Contract Clause: 52.219-90	R
PM-06	New Technology Insertion and Reporting Plan	Frequency: AR Initial: 60 DACA	R
PM-07	New Technology Reports and Disclosures	Initial: Per Contract Clause: 1852.227-70	R
PM-08	Master Action Item Database (MAID)	Frequency: Weekly Initial: 14 DACA	R
PM-09	Knowledge Capture Plan and Database	Frequency: AG Initial: 45 DACA	R
PM-10	Spares Plan and Parts List	Frequency: AG Initial: 60 DACA Subsequent: PDR – 14 days	A
PM-11	Insurance Certification	Frequency: Annually Initial: 7 DACA	R
PM-12	Safety and Health Plan	Initial: Proposal	A
PM-13	Safety and Health Report	Frequency: Per Contract Clause: GSFC 52.223.91	R
PM-14	GOES-R Data Books	Initial: LRR	A

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Program Management DID (cont'd)

ID No.	Document Title	Due Date, Maturity	NASA Accept.
PM-15	DD Form 1419, DOD Industrial Plant Equipment Requisition	Frequency: AR	
PM-16	Organization Conflict of Interest Avoidance Plan	Initial: 30 DACA	
PM-17	Information Technology Security Plan, Contingency Plan, Assessment Plans, and Annual Updates	Initial: 30 DACA Final: In accordance with 1852.204.76	
PM-18	Meeting Minutes	Frequency: AR	I
PM-19	Kick-Off Meeting Data Packages	Initial: Meeting +7 days	R
PM-20	Bi-weekly Status Reports	Frequency: Bi-Weekly Initial: 14 DACA	R
PM-21	Project Management Review (PMR) Data Package	Frequency: Monthly Initial: 60 DACA Subsequent: PMR -7 days	R

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Design Reviews DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
DR-01	System Design Review Data Package	Preliminary: SDR-14 Update: SDR -7 days Final: SDR	R
DR-02	Sub-System Preliminary Design Review (PDR) Data Package	Preliminary: Subsystem PDR -14 days Update: Sub System PDR – 7 days Final: Sub-System PDR	R
DR-03	PDR Data Package	Preliminary: PDR – 14 days Update: PDR – 7 days Final: PDR	R
DR-04	Sub-System Critical Design Review (CDR) Data Package	Preliminary: Subsystem CDR–14 days Update: Sub System CDR – 7 days Final: Sub-System CDR	R
DR-05	CDR Data Package	Preliminary: CDR – 14 days Update: CDR – 7 days Final: CDR	R
DR-06	Pre-Environmental Review (PER) Data Package	Preliminary: PER of each S/C – 14 days Update: PER of each S/C – 7 days Final: PER of each S/C	R
DR-07	Satellite Pre-Shipment Review (PSR) Data Package	Preliminary: PSR of each S/C – 14 days Update: PSR of each S/C – 7 days Final: PSR of each S/C	R
DR-08	Satellite Storage Review (SSR) Data	Preliminary: SSR of each S/C – 14 days Update: SSR of each S/C – 7 days Final: SSR of each S/C	R

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Resource Management DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
RM-01	Earned Value Measurement System (EVMS) Plan	Initial: Preliminary submission after notification of selection, but prior to contract award. Subsequent: Due 60 DACA Updated if EVM System Architecture changes	R
RM-02	Integrated Baseline Review (IBR) Data Package	Initial: IBR -4 weeks (minimum)	R
RM-03	Contract Performance Reports	Frequency: Formats 1-5 Monthly (no later than 15 calendar days after accounting calendar month end date) Initial: Formats 1-5 Monthly (no later than 15 calendar days after accounting calendar month end date:	I
RM-04	Financial Management Reports	Frequency: Monthly (533M): due NLT 10 calendar days after the close of contractor's monthly accounting period. Quarterly (533Q): due on the 15 th of the month preceding the quarter being reported. Initial: Monthly: (533M): due NLT 10 calendar days after the close of contractor's monthly accounting period. Quarterly (533Q): due on the 15 th of the month preceding the quarter being reported.	R

Resource Management DID (cont'd)

ID No.	Document Title	Due Date, Maturity	NASA Accept.
RM-05	Cost Analysis Data Requirement (CADRe)	Initial: Preliminary 60 DACA Subsequent: Update: IPDR -45 days Update: CDR +14 days Update: LRD -30 days Final: Launch +90 days	R
RM-06	Manpower Report	Frequency: Monthly Initial: 30DACA	R
RM-07	Spacecraft Master Schedule	Frequency: Monthly AR Initial: 60 DACA.	R

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Configuration Management DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
CM-01	Configuration Management Plan	Frequency: AG Initial: 30 DACA	R
CM-02	Configuration Item Identification List	Frequency: AR Initial: 75 DACA	R
CM-03	Drawing Tree	Frequency: AR Initial: PDR – 14 days Subsequent: CDR – 14 days	R
CM-04	Document Tree	Frequency: AR Initial: SDR + 30 days Subsequent: PDR – 14 days	R
CM-05	Configuration Control Board (CCB) Documentation	Frequency: AR	I
CM-06	Configuration Change Requests (CCR) Class I	Frequency: AG Initial: AG	A
CM-07	Configuration Change Requests (CCR) Class II	Frequency: AG Initial: AG	R

Information Technology Management DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
IM-01	Test Data Analysis System (TDAS) Documentation	Initial: TDAS 1 st Use – 60 days	R
IM-02	TDAS Operations Manual	Initial: TDAS 1 st Use – 60 days	R
IM-03	TDAS Training	Initial: TDAS 1 st Use – 30 days	R
IM-04	Satellite Ground System Test Data Interface Control Document (ICD)	Initial: CDR	A

Risk Management DID

ID No.	Document Title	Due Date, Maturity	NASA Accept
RK-01	Risk Management Plan	Initial: 30 DACA Subsequent: SDR	R
RK-02	Risk List	Frequency: AG Initial: AG	R

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Systems Engineering DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
SE-01	Systems Engineering Management Plan	Initial: 30 DACA Subsequent: 90 DACA	R
SE-02	Spacecraft Requirements Specification	Initial: SRD Dry Run – 14 days Subsequent: SDR	A
SE-03	Spacecraft Detailed Design Specification	Initial: PDR – 14 days Subsequent: CDR – 14 days	I
SE-04	Spacecraft Performance Verification Plan	Initial: 30 DACA Subsequent: SDR – 14 days	A
SE-05	Spacecraft to Instrument ICDs	Frequency: AR Initial: PDR – 60 days Subsequent: CDR – 14 days	R
SE-06	Spacecraft Communications Services ICDs	Initial: PDR – 30 days Subsequent: CDR – 30 days SCTV – 60 days	A
SE-07	Satellite Level Instrument Interface INR Analysis and Test Plan	Initial: SDR -14 days Subsequent: CDR -14 days	A
SE-08	Satellite Level Instrument Interface INR Analysis Report and Data	Initial: PDR – 14 days Subsequent: CDR – 14 days	A
SE-09	Satellite Level Instrument Interface INR Test Report and Data	Initial: Test Event +30 days	A
SE-10	Schematics and Block Diagrams	Frequency: AR Initial: PDR Subsequent: CDR Update: I&T TRR Update: GFP Instrument integration PSR	A

Systems Engineering DID (cont'd)

ID No.	Document Title	Due Date, Maturity	NASA Accept.
SE-11	Contamination Control Plan	Initial: PDR -14 days Subsequent: CDR -14 days	R
SE-12	Spacecraft Contamination Model and Report	Frequency: AR Initial: PDR – 14 days Subsequent: CDR – 14 days	R
SE-13	Electrostatic Discharge (ESD) Control Plan	Initial: PDR – 14 days Subsequent: CDR – 14 days	A
SE-14	Radiation Shielding and Dose Analysis Report	Frequency: AR Initial: PDR – 14 days Subsequent: CDR – 14 days	R

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Safety & Mission Assurance DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
MA-01	Mission Assurance Implementation Plan	Frequency: AR Initial: PDR – 30 days Subsequent: CDR -30 days	A
MA-02	As-Designed Parts List (ADPL)	Initial: CDR – 10 days	A
MA-03	As-Built Parts List (ABPL)	Initial: PSR – 10 days	A
MA-04	Material and Processes Control Plan	Initial: PDR -30 days	A
MA-05	EEE Parts Control Program Plan	Initial: 30 DACA	A
MA-06	Material Usage Agreement/Stress Corrosion Form	Frequency: AG	A
MA-07	As-Designed Materials and Lubrication List	Frequency: AG	A
MA-08	As-Built Materials and Lubrication List	Frequency: AG	A
MA-09	System Safety Program Plan	Initial: SDR -14 days	A
MA-10	Safety Data Package (SDP) / Missile System Pre-Launch Safety Package (MSPSP)	Initial: PDR + 30 days Subsequent: CDR – 30 days PSR – 60 days	A
MA-11	Safety Non-Compliance / Waiver Requests	Frequency: AG	A
MA-12	Pre-Mishap Plan	Initial: PDR – 14 days Subsequent: PSR	A
MA-13	Safety Requirements Compliance Checklist	Initial: PDR + 30 days	R
MA-14	Preliminary Hazard Analysis	Initial: PDR + 30 days	A
MA-15	Operations Hazard Analysis	Initial: CDR + 45 days	A

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Safety and Mission Assurance DID (cont'd)

ID No.	Document Title	Due Date, Maturity	NASA Accept.
MA-16	GIDEP Alert / NASA Advisory Disposition	Frequency: AR Initial: GIDEP Alert / NASA Advisory Disposition initial response within 30 days	R
MA-17	Failure Mode and Effects Analysis (FMEA) and Critical Items List (CIL) Report	Frequency: AG Initial: PDR – 30 days Subsequent: CDR - 30 days	R
MA-18	Limited Life Items List	Frequency: AG Initial: PDR – 30 days Subsequent: CDR - 30 days	R
MA-19	Request for Use of Multi-Mission or Previously Designed, Fabricated, or Flown Hardware	Initial: 60 DACA	A
MA-20	Parts Stress Analysis Report	Frequency: AG Initial: PDR – 30 days Subsequent: CDR - 30 days	R
MA-21	Worst Case Analyses Report	Frequency: AG Initial: PDR – 30 days Subsequent: CDR - 30 days	R
MA-22	Reliability Program Plan	Initial: – 30 DACA Subsequent: PDR -30 days	R
MA-23	Reliability Block Diagrams and Predictions Report	Frequency: AG Initial: PDR – 30 days Subsequent: CDR - 30 days	R
MA-24	Probabilistic Risk Assessment (PRA) Report	Frequency: AG Initial: PDR – 30 days Subsequent: CDR - 30 days	R
MA-25	Trend Analysis Plan and Data Reports	Frequency: AG Initial PDR – 30 days Subsequent: CDR - 30 days	R
MA-26	Orbital Debris Assessment	Frequency: AR Initial: PDR Subsequent: CDR	A
MA-27	Verification Tracking Log	Frequency: AR Initial PSR – 30 days	R

Spacecraft Management DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
SC-MNGT-01	Satellite Photos and Videos	Frequency: AG	R
SC-MNGT-02	Satellite Operations Handbook (SOH)	Initial: LRD -30 months Subsequent: LRD -9months Launch +6 Months (Incorporates Flight Data)	A

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Spacecraft Mechanical DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
SC-MECH-01	Fields-of-View (FOV) Analysis Report	Initial: PDR Subsequent: CDR	R
SC-MECH-02	Solid Model	Initial: PDR - 30 days Subsequent: CDR – 30 days	R
SC-MECH-03	Critical Mechanical Clearance List and Model	Initial: PDR Subsequent: CDR PSR	R
SC-MECH-04	Alignment Plan	Initial: PDR Subsequent: CDR	R
SC-MECH-05	Alignment Report	Initial: PSR	R
SC-MECH-06	Stress Analysis Report	Initial: CDR - 30 days Subsequent: PSR – 30 days	R
SC-MECH-07	Structural and Mechanical Subsystem Performance Analysis Report	Initial: PDR Subsequent: CDR	R
SC-MECH-08	Structural Math Models and Report	Initial: PDR - 30 days Subsequent: Subsystem CDR – 30 days Post Modal +60 days	R
SC-MECH-09	Mass Properties Report	Frequency: Monthly Initial: SDR	R

Spacecraft Thermal DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
SC-THER-01	Reduced Integrated Satellite Thermal Model and Report	Initial: PDR -120 days Subsequent: CDR -120 days; SCTV -60 days PSR -60 days	R
SC-THER-02	Detailed Integrated Satellite Thermal Model	Initial: CDR – 180 days Subsequent: CDR -30 days; SCTV -60 days; PSR -60 days	R
SC-THER-03	Thermal Performance Report	Initial: CDR -30 days Subsequent: PSR – 60 days Launch +15 months	R
SC-THER-04	Thermal Environment for GFP Instruments	Initial: PDR -120 days Subsequent: CDR -120 days; PSR -60 days	R

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Spacecraft GN&C DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
SC-GN&C-01	GN&C Algorithm Document	Initial: CDR -14 days Subsequent: SSR -90 days	R
SC-GN&C-02	GN&C Sensor Models	Initial: PDR -14 days Subsequent: CDR -14 days	R

Spacecraft C&DH DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
SC-C&DH-01	Satellite Telemetry and Command Handbook	Frequency: AG Initial: PDR +30 days Subsequent: CDR +30 days	R
SC-C&DH-02	Satellite Telemetry and Command Database	Frequency: AG Initial: PDR +30 days Subsequent: CDR +30 days Final: Launch +180 days	R

Spacecraft Communications DID

ID No.	Document Title	Due Date, Maturity	NASA Accept
SC-COMM-01	Communications Link Analysis and Link Budgets	Frequency: AR Initial: 30 DACA Subsequent: PDR -30 days; Unit Test + 30 days; SCTV +30 days; LRD +60 days	R
SC-COMM-02	Selection of Raw Data and GRB FEC Coding and Modulation	Initial: PDR -30 days Subsequent: CDR -30 days	R
SC-COMM-03	Communications Subsystem Unit Test Data Reports	Initial: Test Completion -10 days	R
SC-COMM-04	Multipaction and Corona Test and Analysis Report	Initial: PDR Frequency: CDR; Communication Subsystem Testing -60 days	R
SC-COMM-05	Communications Subsystem Information Required for ITU and NTIA Filings	Initial: CDR +12 months Subsequent: SCTV +60 days	R
SC-COMM-06	Communications Subsystem Test Data Reports	Frequency: AG Initial: Each Test +30 days	R

ID **Object
Number**

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Spacecraft Power DID

ID No.	Document Title	Due Date, Maturity	NASA Accept.
SC-POWR-01	Electromagnetic Interference (EMI) / Electromagnetic Compatibility (EMC) Plan	Initial: PDR -14 days Subsequent: CDR	A
SC- POWR 02	Spacecraft Power Energy Balance Model and Analysis	Initial: Power Subsystem PDR -14 days Subsequent: Power Subsystem CDR; PSR	R
SC- POWR 03	Power Subsystem Performance Analysis Report	Initial: Power: Subsystem PDR -14 days Subsequent: Power Subsystem CDR; PSR	A
SC-POWR-04	Power Profile Report	Frequency: AG Initial: PDR – 14 days Subsequent: CDR – 14 days	R
SC-POWR-05	Solar Panel & Solar Array Assembly Output Power Predictions	Initial: SDR -14 days Subsequent: PDR – 14 days; CDR – 14 days; PSR – 14 days	A
SC-POWR-06	Battery Design and Performance Analysis Report	Initial: SDR -14 days Subsequent: PDR – 14 days; CDR – 14 days; PSR – 14 days	A
SC-POWR-07	Battery Cell Acceptance and Cell Qualification Test Plan	Initial: Power Subsystem CDR -30days	A
SC-POWR-08	Battery Acceptance, Qualification, and Life Test Plan	Initial: 6 months after contract award Subsequent: Power Subsystem CDR -30 days	A
SC-POWR-09	Battery Handling, Storage, and Transportation Plan	Initial: PDR -14 days	A
SC-POWR-10	Solar Panel Qualification and Solar Panel and Array Acceptance Test Plan	Initial: 6 months after contract award Subsequent: PDR –14 days CDR – 14 days	A

ID **Object
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Spacecraft Flight Software DID

ID No.	Document Title	Due Date, Maturity	NASA Accept
SC-FLSW-01	Software Management Plan	Initial: 60 DACA Subsequent: 180 DACA SWPDR SWCDR SWTRR SWQR	A
SC-FLSW-02	Software Assurance Plan	Initial: 30 DACA Subsequent: 90 DACA	A
SC-FLSW-03	Software Requirements Specification	Initial: Software Requirements review – 14 days Subsequent: SWPDR -14 days SWCDR -14 days SWTRR – 14 days	R
SC-FLSW-04	Software Design Document	Initial: SWPDR – 14 days Subsequent: SWCDR -14 days SWTRR -14 days	R
SC-FLSW-05	Software Test Plan	Initial: SWPDR Subsequent: SWCDR SWTRR	R
SC-FLSW-06	Software Test Procedures	Initial: SWCDR Subsequent: SWTRR	R
SC-FLSW-07	Software Test Report	Initial: Conclusion Formal Software Qualification Testing	R
SC-FLSW-08	Software Maintenance Manual	Initial: Final with Software Release Delivery Package	R
SC-FLSW-09	Software Preliminary Design Review (SWPDR) Data Package	Initial: (presentation slides only to portal): SWPDR -5 days Subsequent: Final (full package 10 hardcopies, 5 CDs, & portal): SWPDR	R
SC-FLSW-10	Software Critical Design Review (SWCDR) Data Package	Initial: (presentation slides only to portal): SWCDR -5 days Subsequent: Final (full package 5 hardcopies, 2 CDs, & portal): SWCDR	R
SC-FLSW-11	Flight Software Test Readiness Review (SWTRR) Data Package	Initial: (presentation slides only to portal): SWTRR -3 days Subsequent: Final (full package 10 hardcopies, 5 CDs, & portal): SWTRR	R

ID **Object
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Spacecraft Flight Software DID (cont'd)

ID No.	Document Title	Due Date, Maturity	NASA Accept
SC-FLSW-12	Software Qualification Review (SWQR) Data Package	Initial: (presentation slides only to portal): SWQR -3 days Subsequent: Final (full package 5 hardcopies, 2 CDs, & portal): SWQR	R
SC-FLSW-13	Software Release Delivery Package	Frequency: AG Initial: PSR	R
SC-FLSW-14	Software Delivery & Operations Transition Plan	Initial: SWTRR Subsequent: Update: PER; Final with Software Release Delivery Package	A
SC-FLSW-15	Software Architecture Document	Initial: SDR -30 days Subsequent: Final: SWPDR -30 days	I
SC-FLSW-16	Maintenance, Test, and Operations Manual for the Flight Software Development Environment	Initial: Final with delivery of the FSDE	R
SC-FLSW-17	Field Programmable Gate Arrays (FPGA) Development Plan	Initial: 60 DACA Subsequent: 180 DACA	A
SC-FLSW-18	Field Programmable Gate Arrays (FPGA) Design Data Package	Initial: Delivered as generated for each FPGA	R

Spacecraft Magnetometer DID

ID No.	Document Title	Due Date, Maturity	NASA Accept
SC-MAGN-01	Spacecraft Magnetic Control Plan for Magnetometer Performance Assurance	Frequency: AR Initial: PDR -14 days Subsequent: CDR -14 days	I
SC-MAGN-02	Spacecraft Magnetic Field Model	Initial: PDR -14 days Subsequent: CDR -14 days	A
SC-MAGN-03	Magnetometer Calibration Data Book	Initial: CDR -14 days Subsequent: PSR -14 days	A

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Spacecraft Ground Support Equipment DID

ID No.	Document Title	Due Date, Maturity	NASA Accept
GS-01	Spacecraft Simulator Design Document	Frequency: AR Initial: Simulator Maintenance Training Subsequent: Delivery of S/C Simulator; Final: Simulator handover to government	R
GS-02	Spacecraft Simulator User's Operations and Maintenance Manual	Frequency: AR Initial: Simulator Delivery Subsequent: Simulator maintenance training; Final: Simulator handover to government	R
GS-03	Spacecraft Simulator Training Documentation	Initial: Simulator Delivery; Subsequent: Simulator Maintenance Training; Final: Simulator handover to government	R

ID **Object
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Spacecraft Integration and Test DID

ID No.	Document Title	Due Date, Maturity	NASA Accept
IT-01	Integration and Test Plans	Initial: SRD Subsequent: Interim: PDR Final: CDR -6 months	A
IT-02	Satellite Integration & Test Plan	Initial: CDR -3 months Subsequent: CDR CDR +2 months	A
IT-03	Satellite Launch Site Integration Plan (LSIP)	Initial: CDR -90 days Subsequent: PSR -12 months PSR - 90 days	R
IT-04	Satellite Launch Commit Criteria	Initial: LRD - 6months Subsequent: LRD - 30 days	A
IT-05	Subsystem Level Test Procedures	Frequency: AR Initial: First Use -75 days Final: First Use -30 days	A/R (see DID)
IT-06	Bus/Spacecraft Level Test Procedures	Frequency: AR Initial: First Use -75 days Final: First Use -30 days	A/R (see DID)
IT-07	Satellite Level Test Procedure	Frequency: AR Initial: First Use -75 days Final: First Use -30 days	A/R (see DID)
IT-08	Subsystem Level Post-Test Data Package	Initial: Test completion +30 days	R
IT-09	Bus/Spacecraft Level Post-Test Data Package	Initial: Test completion +30 days	R
IT-10	Satellite Level Post-Test Data Package	Initial: Test completion +30 days	R
IT-11	Transportation and Handling Plan & Procedures	Initial: 60 days prior to first use (i.e. ship to launch site)	R
IT-12	Ground Storage Plan	Initial: SSR -30 days	A
IT-13	GFP Instrument Safe-To-Mate Test Procedure	Initial: PDR Subsequent: CDR CDR +90 days	A

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Spacecraft Launch and Operations DID

ID No.	Document Title	Due Date, Maturity	NASA Accept
LO-01	Satellite/Launch Vehicle Interface Requirements Document (IRD)	Initial: LRD -40 months Subsequent: -36 months	A
LO-02	Satellite Mission Insignia	Initial: LRD -16 months	A
LO-03	Satellite Training Program Plan	Initial: PER	R
LO-04	Satellite Mission Operations Plan	Initial: LRD -12 months: 1 st Satellite Subsequent: 12 months: each additional Satellite	R
LO-05	Handover Review Data Package	Initial: Launch +180 days: 1 st Satellite Subsequent: Launch +180 days; each additional Satellite	R

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL17	3	3 Data Item Descriptions
SCCDRL18	3.1	3.1 Program Management Plan
SCCDRL19	3.1.0-1	DESCRIPTION OF REQUIRED DATA
		<ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-01 2. <u>Title:</u> PROGRAM MANAGEMENT PLAN 3. <u>Use:</u> Describes how the Program is organized and managed. It provides the management structure, its system of operation, responsible lines of communications, and key personnel assignments. 4. <u>Preparation Information:</u>
SCCDRL20	3.1.0-2	The Program Management Plan shall address the overall organization, management approach, and structure of the GOES-R Program plus its interrelationships with the parent company and the subcontractors, and relationship with the Government.
SCCDRL21	3.1.0-3	The Program Management Plan shall describe how and where the program will operate during all phases of the contract.
SCCDRL22	3.1.0-4	The Program Management Plan shall delineate how the requirements of the Statement of Work (SOW) will be achieved and include a description of planned activities for identifiable SOW requirements.
SCCDRL23	3.1.0-5	The planned work in the Program Management Plan shall follow a comprehensive and product-oriented Work Breakdown Structure (WBS).
SCCDRL24	3.1.0-6	The Program Management Plan shall describe the nature of the tasks to be performed and related potential problems, discuss the approach to problem avoidance and/or solution, and address the degree to which proposed personnel and procedures are proven through similar experience.
SCCDRL25	3.1.0-7	The Program Management Plan shall address interfaces with the Government and with any Government Furnished Property (GFP) suppliers.
SCCDRL26	3.1.0-8	The Program Management Plan shall indicate critical paths, long-lead items and significant milestones down to at least the lowest level of the CWBS.
SCCDRL27	3.1.0-9	The Program Management Plan shall indicate the need for additional definition of spacecraft and mission, and when this information is required to avoid schedule slippage.
SCCDRL28	3.1.0-10	The Program Management Plan shall include graphical displays (i.e. flow diagrams, CWBS, logic networks) to reduce verbal descriptive material.
SCCDRL29	3.1.0-11	<p>The Program Management Plan shall provide an organizational chart(s) and sufficient supplemental narrative to describe fully the organization proposed for carrying out the Program 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:</p> <ol style="list-style-type: none"> 1. The authority of the GOES-R 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. 2. How and by whom interdepartmental work will be monitored and the authority of the

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SCCDRL29	3.1.0-11	program manager over interdepartmental work.
		<ol style="list-style-type: none"> 3. 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. 4. The Program team members with names, functions, and short resume.
SCCDRL30	3.1.0-12	The Program Management Plan shall provide contractual procedures proposed for the Program to effect administrative and engineering changes, describing any differences from existing procedures.
SCCDRL31	3.1.0-13	The Program Management Plan shall describe management techniques to be employed in minimizing program costs and schedule impacts, including controls to be exercised over subcontractors and suppliers.
SCCDRL32	3.1.0-14	The Program Management Plan shall discuss and illustrate the proposed GOES-R Mission Assurance organizational structure, including staffing plans, reporting channels, authority and responsibilities, and management visibility.
SCCDRL33	3.1.0-15	The Program Management Plan shall discuss whether the technical, test, manufacturing and system safety/quality assurance/ reliability/ configuration management personnel required for this program (as indicated in your proposed labor hours) are presently on payroll and immediately available for this work.
SCCDRL34	3.1.0-16	The Program Management Plan shall state the number and kind of persons who would have to be hired, and plans to obtain them.
SCCDRL35	3.1.0-17	The Program Management Plan shall state the independence of the system safety/quality assurance functions.
SCCDRL36	3.1.0-18	The Program Management Plan shall explain/describe the schedule administration/control.
SCCDRL37	3.1.0-19	The Program Management Plan shall describe how the schedules are developed, maintained and updated.
SCCDRL38	3.1.0-20	The Program Management Plan shall explain the internal review cycle of the scheduling process.
SCCDRL39	3.1.0-21	The Program Management Plan shall explain how internal audits/reviews ensure that scheduling data reported to the Government accurately reflects the work status.
SCCDRL40	3.1.0-22	The Program Management Plan shall describe how subcontracts will be managed and reviewed, and describe the performance milestones of each.
SCCDRL41	3.1.0-23	The Program Management Plan shall address the design review process.
SCCDRL42	3.1.0-24	The Program Management Plan shall list and describe the planned subsystem reviews.
SCCDRL43	3.1.0-25	The Program Management Plan shall address the Contractor's approach to performance verification.
SCCDRL44	3.2	3.2 Contractor's WBS
SCCDRL45	3.2.0-1	DESCRIPTION OF REQUIRED DATA <ol style="list-style-type: none"> 1. <u>CDRL No</u>: PM-02 2. <u>Title</u>: CONTRACTOR'S WBS

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SCCDRL45	3.2.0-1	<p>3. Use: To facilitate program planning and control and for financial and technical reporting</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL46	3.2.0-2	The Contractor's Work Breakdown Structure (WBS) shall document Government accepted changes to the Government WBS and Dictionary with an updated WBS diagram and description of task elements.
SCCDRL47	3.2.0-3	The Contractor's WBS shall define all work included in the GOES-R development life cycle
SCCDRL48	3.2.0-4	The Contractor's WBS shall be product-oriented and hierarchically relate all work, products, and end items.
SCCDRL49	3.2.0-5	The Contractor's WBS shall provide a framework for project work definition to a level of detail consistent with cost, schedule, technical, and risk oversight as desired by contractor's management and required by Earned Value Management.
SCCDRL50	3.2.0-6	The Contractor's WBS shall contain a companion WBS dictionary that describes the overall structure and content of each individual element of the WBS.
SCCDRL51	3.3	3.3 NASA Property in the Custody of the Contractors
SCCDRL52	3.3.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <p>1. <u>CDRL No:</u> PM-03</p> <p>2. <u>Title:</u> NASA PROPERTY IN THE CUSTODY OF THE CONTRACTORS</p> <p>3. Use: For budget, cost and property control</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL53	3.3.0-2	The NASA Property in the Custody of the Contractors report shall consist of NASA Form 1018 in accordance with NFS 1845.505-14, the instructions on the form, subpart 1845.71, and any supplemental instructions for the current reporting period issued by NASA.
SCCDRL54	3.4	3.4 Small Business Subcontracting Plan
SCCDRL55	3.4.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <p>1. <u>CDRL No:</u> PM-04</p> <p>2. <u>Title:</u> SMALL BUSINESS SUBCONTRACTING PLAN</p> <p>3. Use: To establish goals for subcontracting with small businesses.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL56	3.4.0-2	The Small Business Subcontracting Plan shall be in accordance with FAR 52.219-9, Alt.II.
SCCDRL57	3.4.0-3	The Small Business Subcontracting Plan shall show status of all relevant contracts, with justification for the amount towards the various small business concerns.
SCCDRL58	3.5	3.5 Small Business Subcontracting Plan Reports

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SCCDRL59	3.5.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-05 2. <u>Title:</u> SMALL BUSINESS SUBCONTRACTING PLAN REPORTS 3. <u>Use:</u> To report performance against goals for subcontracting with small businesses. 4. <u>Preparation Information:</u>
SCCDRL60	3.5.0-2	The Small Business Subcontracting Plan Reports shall follow the Individual Subcontract Reports (ISRs) and Summary Subcontract Reports (SSRs) in accordance with FAR 52.219-9, Alt.II; and GSFC 52.219-90.
SCCDRL61	3.6	3.6 New Technology Insertion and Reporting Plan
SCCDRL62	3.6.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-06 2. <u>Title:</u> NEW TECHNOLOGY INSERTION AND REPORTING PLAN 3. <u>Use:</u> Defines contractor plan for reporting new technology to the Government in accordance with provisions and requirements set forth in the contract. 4. <u>Preparation Information:</u>
SCCDRL63	3.6.0-2	The New Technology Insertion and Reporting Plan shall provide the size and nature of the scientific and technological efforts in which inventions, discoveries, improvements and innovations may be expected, including the scientific disciplines involved in these efforts.
SCCDRL64	3.6.0-3	The New Technology Insertion and Reporting Plan shall summarize the technical problems to be solved that are most likely to generate new technology.
SCCDRL65	3.6.0-4	The New Technology Insertion and Reporting Plan shall emphasize new technology reporting by the top levels of management of the organization, and specific means (e.g., company directives, newsletters) to be used to communicate such emphasis to the organization.
SCCDRL66	3.6.0-5	The New Technology Insertion and Reporting Plan shall provide the organizational placement and qualifications of (a) the individual(s), assigned as company Technology Utilization/New Technology representative(s), and their staffs, and of (b) any others having substantial and specific responsibility for new technology reporting.
SCCDRL67	3.6.0-6	The New Technology Insertion and Reporting Plan shall describe all significant organization relationships.
SCCDRL68	3.6.0-7	The New Technology Insertion and Reporting Plan shall provide the plans for both the initial and continuing indoctrination of senior project personnel, supervision, and other appropriate technical personnel in the benefits, responsibilities, and details of technology reporting.
SCCDRL69	3.6.0-8	The New Technology Insertion and Reporting Plan shall provide the plans to establish, maintain, and follow active and effective procedures to ensure that reportable items are promptly identified and reported in a timely manner as required by the New Technology clause.

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SCCDRL70	3.6.0-9	The New Technology Insertion and Reporting Plan shall include plans for system(s) to ensure reporting of that new technology, which does not constitute invention (any new or improved products, devices, materials, processes, methods, scientific or technical computer programs, techniques, compositions, systems, machines, apparatuses, articles, fixtures, and tools are reportable, whether or not they constitute invention).
SCCDRL71	3.6.0-10	The New Technology Insertion and Reporting Plan shall provide the details of actual documentation of reportable items, and the methods by which they will be reported, including plans for (a) submission of sufficient detail to permit evaluation of the novelty and potential usefulness of the reportable items, (b) avoiding unnecessary re-documentation by inclusion of existing documents or abstracts there from.
SCCDRL72	3.6.0-11	The New Technology Insertion and Reporting Plan shall provide the level of effort anticipated for development and incorporation into the system. (Quarterly/monthly rates and estimated disclosure output rates are desirable.)
SCCDRL73	3.7	3.7 New Technology Reports and Disclosures
SCCDRL74	3.7.0-1	DESCRIPTION OF REQUIRED DATA
		<ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-07 2. <u>Title:</u> NEW TECHNOLOGY REPORTS AND DISCLOSURES 3. <u>Use:</u> To report new technology developed under the contract. 4. <u>Preparation Information:</u>
SCCDRL75	3.7.0-2	The New Technology Reports and Disclosures shall be in accordance with NFS 1852.227-70
SCCDRL76	3.8	3.8 Master Action Item Database (MAID)
SCCDRL77	3.8.0-1	DESCRIPTION OF REQUIRED DATA
		<ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-08 2. <u>Title:</u> MASTER ACTION ITEM DATABASE (MAID) 3. <u>Use:</u> To provide responses to action items assigned to the contractor. 4. <u>Preparation Information:</u>
SCCDRL78	3.8.0-2	The MAID shall contain at least the following sections: title, original due date, current due date, creation date, description, numbering scheme, creator, assigned to, status, notes section, and importance rating (i.e. green, yellow, red).
SCCDRL79	3.8.0-3	The MAID shall be created in Microsoft Excel format and submitted electronically to the GOES-R government portal.
SCCDRL80	3.8.0-4	The MAID shall include any action items generated from meetings and listed in the Meeting Minutes.
SCCDRL81	3.9	3.9 Knowledge Capture Plan and Database
SCCDRL82	3.9.0-1	DESCRIPTION OF REQUIRED DATA
		<ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-09 2. <u>Title:</u> KNOWLEDGE CAPTURE PLAN AND DATABASE

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SCCDRL82	3.9.0-1	<p>3. Use: Indicate how contractor will identify lessons learned and knowledge for sustaining engineering.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL83	3.9.0-2	The Knowledge Capture Plan shall describe how lessons learned from GOES-R development, integration, and test will be captured, dispositioned, and communicated.
SCCDRL84	3.9.0-3	The Knowledge Capture Plan format is left to Contractor discretion and shall be submitted to the GOES-R government portal.
SCCDRL85	3.9.0-4	The Knowledge Capture Plan shall describe how training will be performed to convey lessons learned as they apply to the development, integration, and test of future GOES-R flight models.
SCCDRL86	3.9.0-5	The Knowledge Capture Plan shall describe how lessons learned will be captured and applied to subcontractor development of critical subassemblies and assemblies (e.g., FPAs).
SCCDRL87	3.9.0-6	The Knowledge Capture Database shall contain lessons learned from applicable prior and existing contractor and government programs.
SCCDRL88	3.9.0-7	The Knowledge Capture Database shall have mitigation actions and list the responsible team member for each lesson learned.
SCCDRL89	3.10	3.10 Spares Plan and Parts List
SCCDRL90	3.10.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <p>1. <u>CDRL No:</u> PM-10</p> <p>2. <u>Title:</u> SPARES PLAN AND PARTS LIST</p> <p>3. Use: The Spares Plan and Parts List provides the Program with contingency for unplanned components/subsystem anomalies of failures. The Spares Plan and Parts List allows the government to review the contractor's spares list.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL91	3.10.0-2	The Spares Plan and Parts List shall address the contractor's approach to sparing philosophy for the program in the initial delivery.
SCCDRL92	3.10.0-3	In the initial delivery, the Spares Plan and Parts List shall address to what configuration level they plan to spare, schedule for spare procurement, and guidelines for utilizing spares, including all GSE and Simulators.
SCCDRL116 4	3.10.0-4	All subsequent deliveries of the Spares Plan and Parts List shall define and justify the contractor's position for the spares proposed for the spacecraft.
SCCDRL116 5	3.10.0-5	All subsequent deliveries of the Spares Plan and Parts List shall present the schedule and method for obtaining the spares.
SCCDRL114 5	3.10.0-6	All subsequent deliveries of the Spares Plan and Parts List shall include all GSE and Simulators.
SCCDRL97	3.11	3.11 Insurance Certification

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SCCDRL98	3.11.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-11 2. <u>Title:</u> INSURANCE CERTIFICATION 3. <u>Use:</u> To verify that the contractor maintains workers' compensation, employer's liability, comprehensive general liability (bodily injury), and comprehensive automobile liability (bodily injury and property damage) insurance. 4. <u>Preparation Information:</u>
SCCDRL99	3.11.0-2	The Insurance Certification shall contain a letter certifying the maintenance of insurance policies and identifying the insurers.
SCCDRL100	3.12	3.12 Safety and Health Plan
SCCDRL101	3.12.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-12 2. <u>Title:</u> SAFETY AND HEALTH PLAN 3. <u>Use:</u> Defines contractor plan to comply with Safety and Health provisions of the contract. 4. <u>Preparation Information:</u>
SCCDRL102	3.12.0-2	The Safety and Health Plan shall be prepared in accordance with NFS 1852.223-73, "Safety and Health Plan".
SCCDRL103	3.13	3.13 Safety and Health Report
SCCDRL104	3.13.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-13 2. <u>Title:</u> SAFETY AND HEALTH REPORT 3. <u>Use:</u> To document any accident, incident, or exposure resulting in fatality, lost-time occupational injury, occupational disease, contamination of property beyond any stated acceptable limits. 4. <u>Preparation Information:</u>
SCCDRL105	3.13.0-2	The Safety and Health Report shall be in accordance with NFS 1852.223-70, Safety and Health; and GSFC 52.223-91, Safety and Health -Additional Requirements.
SCCDRL106	3.14	3.14 GOES-R Data Books
SCCDRL107	3.14.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-14 2. <u>Title:</u> GOES-R DATA BOOKS 3. <u>Use:</u> This document is to provide an introduction to the GOES-R Spacecraft mission and a comprehensive overview of the GOES-R System (including inputs from

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SCCDRL107	3.14.0-1	Ground and GFP Instrument Contractors). It is intended as a quick reference guide, intended for public outreach and education.
		4. <u>Preparation Information:</u>
SCCDRL116 7	3.14.0-2	The GOES-R Data Books shall include Ground and GFP Instrument inputs (provided as Government Furnished Information) (integrated into the GOES-R Data Books by the Spacecraft Contractor) from the Ground and GFP Instrument Contractors.
SCCDRL116 8	3.14.0-3	In addition to electronic delivery, one thousand (1,000) hard copies of the GOES-R Data Books shall be delivered.
SCCDRL108	3.14.0-4	The GOES-R Data Books shall include a comprehensive overview of the satellite and ground operational systems.
SCCDRL114 6	3.14.0-5	The GOES-R Data Books are not proprietary documents and shall be made publicly accessible and not contain data that is controlled by ITAR regulations.
SCCDRL109	3.14.0-6	The GOES-R Data Books shall serve as a convenient desk top technical reference for people who work on the GOES Program and those needing a satellite and ground system overview.
SCCDRL110	3.14.0-7	The GOES-R Data Books shall contain all general characteristics of the missions, including at least the following types of information: <ul style="list-style-type: none"> a) Overview of the GOES Mission (including GFI Ground portion) b) Spacecraft Configuration & Design Concepts c) Subsystem, Payload, and GFP Instrument Descriptions (latter to be provided as GFI) d) All Ground terminal facilities, such as the CDA Station, Space Environment Center (to be provided as GFI). e) Ground architecture and element descriptions (to be provided as GFI) f) Data Product Descriptions (to be provided as GFI) g) Diagrams and descriptions of major ground data flows and processes (to be provided as GFI) h) Launch trajectory, orbit requirements, and ground station location(s) (latter to be provided as GFI) i) Spacecraft Subsystem Technical Performance Summary Tables j) Ground Segment and Element Performance Summary Tables (to be provided as GFI)
SCCDRL111	3.14.0-8	The GOES-R Data Books shall be updated prior to the launch of each satellite.
SCCDRL112	3.14.0-9	The GOES-R Data Books are intended to be used as a reference guide and shall include top level block diagrams, simplified schematics, pictorials and narrative explanations suitable for public distribution.
SCCDRL113	3.15	3.15 DD Form 1419, DOD Industrial Plant Equipment Requisition

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL114	3.15.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-15 2. <u>Title:</u> DD FORM 1419, DOD INDUSTRIAL PLANT EQUIPMENT REQUISITION 3. <u>Use:</u> For contractor to submit to request use of Government Owned Equipment 4. <u>Preparation Information:</u>
SCCDRL115	3.15.0-2	The DD Form 1419, DOD Industrial Plant Equipment Requisition shall be prepared in accordance with NASA FAR Supplement 1845.7102.
SCCDRL116	3.16	3.16 Organization Conflict of Interest Avoidance Plan
SCCDRL117	3.16.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-16 2. <u>Title:</u> ORGANIZATION CONFLICT OF INTEREST AVOIDANCE PLAN 3. <u>Use:</u> Provide for processes and procedures for identifying, reporting, and avoiding organizational conflicts of interest 4. <u>Preparation Information:</u>
SCCDRL118	3.16.0-2	The Organization Conflict of Interest Avoidance Plan shall be prepared in accordance with NFS 1852.237-72, Access to Sensitive Information.
SCCDRL119	3.17	3.17 Information Technology Security Plan, Contingency Plan, Assessment Plans, and Annual Update
SCCDRL120	3.17.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-17 2. <u>Title:</u> INFORMATION TECHNOLOGY SECURITY PLAN, CONTINGENCY PLAN, ASSESSMENT PLANS, AND ANNUAL UPDATES 3. <u>Use:</u> Provides for processes and procedures for securing Information Technology. 4. <u>Preparation Information:</u>
SCCDRL121	3.17.0-2	The Information Technology Security Plan, Contingency Plan, Assessment Plans, and Annual Updates shall be prepared in accordance with NFS 1852.204-76, Security requirements for Unclassified Information Technology Resources.
SCCDRL122	3.18	3.18 Meeting Minutes

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL123	3.18.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-18 2. <u>Title:</u> MEETING MINUTES 3. <u>Use:</u> Focused technical interaction reporting during teleconferences, Technical Interchange Meetings (TIM), Working Groups, and Peer Reviews. 4. <u>Preparation Information:</u>
SCCDRL124	3.18.0-2	Meeting Minutes shall be generated for teleconferences, TIM, and Peer Reviews.
SCCDRL125	3.18.0-3	Meeting Minutes shall be no greater than one page.
SCCDRL126	3.18.0-4	<p>The Meeting Minutes shall identify:</p> <ol style="list-style-type: none"> a) Objective b) Topics addressed with summary of key points and any conclusions or recommendations c) Attendee List d) Action Items (also included in the MAID)
SCCDRL127	3.18.0-5	The Meeting Minutes shall reference the MAID ID number.
SCCDRL128	3.19	3.19 Kick-Off Meeting Data Package
SCCDRL129	3.19.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-19 2. <u>Title:</u> KICK-OFF MEETING DATA PACKAGE 3. <u>Use:</u> First, official government/contractor coordination meeting after contract award. 4. <u>Preparation Information:</u>
SCCDRL130	3.19.0-2	The Kick-Off Meeting Data Package shall contain all presentation and supporting material developed by the contractor for the kick-off meeting.
SCCDRL131	3.20	3.20 Bi-weekly Status Reports
SCCDRL132	3.20.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-20 2. <u>Title:</u> BI-WEEKLY STATUS REPORTS 3. <u>Use:</u> Contract status evaluation. 4. <u>Preparation Information:</u>
SCCDRL133	3.20.0-2	The Bi-weekly Status Reports shall indicate the GOES-R status including a summary of progress made.
SCCDRL134	3.20.0-3	The Bi-weekly Status Reports shall address the work completed since the previous bi-weekly report and address recovery plans if necessary.

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL135	3.20.0-4	The Bi-weekly Status Reports shall include technical progress, including significant accomplishments and milestones reached.
SCCDRL136	3.20.0-5	The Bi-weekly Status Reports shall include problems encountered and proposed corrective action
SCCDRL137	3.20.0-6	The Bi-weekly Status Reports shall indicate any actual or anticipated slip in schedule
SCCDRL138	3.20.0-7	The Bi-weekly Status Reports shall include identification of any Class I or Class II changes
SCCDRL139	3.20.0-8	The Bi-weekly Status Reports shall summarize the planned future work.
SCCDRL140	3.20.0-9	Note: The Bi-weekly Status Reports is intended to be timely and informal and should detail the above topics as changes or problems occur.
SCCDRL141	3.21	3.21 Project Management Review (PMR) Data Package
SCCDRL142	3.21.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> PM-21 2. <u>Title:</u> PROJECT MANAGEMENT REVIEW (PMR) DATA PACKAGE 3. <u>Use:</u> To summarize the progress since the previous Project Management Review 4. <u>Preparation Information:</u>
SCCDRL143	3.21.0-2	<p>The Project Management Status Review Data Package shall include the following items:</p> <ol style="list-style-type: none"> a) Accomplishments since last review, including milestone events that depict critical items of project status for the succeeding two months with a report on the previous two months milestone events b) Schedule c) Technical issues and concerns, including summaries of technical progress and descriptions of the current technical issues and concerns d) Business issues and concerns, including personnel changes e) Current problems and anticipated resolution f) Open contract items g) Planned effort for next review period h) Reliability and quality assurance information i) Outstanding proposals j) Mass properties and power summary k) Flight processor resource utilization l) Financial summary including PMS data and a summary of actual versus planned manpower and reasons for variance m) Subcontractor status including: <ol style="list-style-type: none"> 1) efforts under contract 2) efforts waiting contract award 3) changes to first tier and sub-tier contractors 4) change orders, problems, issues

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL143	3.21.0-2	<ul style="list-style-type: none"> 5) pending subcontractor consent packages n) A list of actions requested of GSFC management o) Update of corporate changes, for example: early warning of <ul style="list-style-type: none"> 1) restructuring activities (including internal reorganizations) 2) indirect/direct rate changes p) Risk review q) MAID review r) Any additional data requested by GSFC
SCCDRL144	3.22	3.22 System Design Review (SDR) Data Package
SCCDRL145	3.22.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> DR-01 <li>2. <u>Title:</u> SYSTEM DESIGN REVIEW (SDR) DATA PACKAGE <li>3. <u>Use:</u> To evaluate the requirements, requirements flow-down, and the operational concepts. To validate the realism of the functional and performance requirements and their congruence with the system configuration selected to conduct the mission. <li>4. <u>Preparation Information:</u>
SCCDRL118 1	3.22.0-2	Thirty (30) hardcopies of the SDR Data Package shall be made available at the review.
SCCDRL146	3.22.0-3	The SDR Data Package shall discuss contractor system level requirements, rationale, and flow-down plans to lower level requirements.
SCCDRL147	3.22.0-4	The SDR Data Package shall include the Spacecraft Requirements Specification and the traceability matrix to applicable government requirements documents.
SCCDRL148	3.22.0-5	The SDR Data Package shall include requirements for the GOES-R satellite, Ground Support Equipment, and ground test software.
SCCDRL149	3.22.0-6	The SDR Data Package shall show how the current concept meets all government specified requirements including interface requirements.
SCCDRL118 3	3.22.0-7	The SDR Data Package shall contain the strategy, methods, and plans for performing Verification and Validation.
SCCDRL150	3.23	3.23 Sub-System Preliminary Design Review (PDR) Data Package

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL151	3.23.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> DR-02 2. <u>Title:</u> SUB-SYSTEM PRELIMINARY DESIGN REVIEW (PDR) DATA PACKAGE 3. <u>Use:</u> The Sub-System PDR is the first major review of the detailed design and is normally held prior to the preparation of formal design drawings. The Sub-System PDR is held when the design is advanced sufficiently to begin some bread board testing and/or the fabrication of design models. 4. <u>Preparation Information:</u>
SCCDRL118 5	3.23.0-2	Twenty (20) hardcopies of the Sub-System PDR Data Package shall be made available at the review.
SCCDRL152	3.23.0-3	Although detailed designs are not expected at this time, the Sub-System PDR Data Package shall include systems engineering, resource allocations, and design analyses in order to demonstrate compliance with requirements.
SCCDRL153	3.23.0-4	The Sub-System PDR Data Package shall include a presentation of the design and interfaces by means of block diagrams, signal flow diagrams, Field-of-View diagrams, schematics, logic diagrams, error budgets, link margins, first interface circuits, packaging plans, configuration and layout sketches, analyses, modeling, simulations, and any early results.
SCCDRL154	3.23.0-5	The Sub-System PDR Data Package shall include supporting data and analyses for mechanical, power, thermal, and electronic design: load, stress, margins, reliability assessments, should be shown.
SCCDRL155	3.23.0-6	<p>The Sub-System PDR Data Package shall address the following minimum items:</p> <ol style="list-style-type: none"> a) Program Management <ol style="list-style-type: none"> 1) Subsystem Cost Review 2) Subsystem Schedule Review 3) Subsystem Risk Review 4) Subsystem Closure of Actions from Previous Review/Changes since the last review 5) Acronyms and Abbreviations b) Systems Engineering <ol style="list-style-type: none"> 1) Subsystem requirements, requirement flow-down and traceability 2) Subsystem Requirements Traceability Matrix 3) Subsystem Performance Budgets 4) Subsystem Contamination Control 5) Subsystem Specification and Drawing Trees 6) Subsystem Mass Properties Report 7) Subsystem Power Profile Report 8) Subsystem GFP Instrument Interface Design, including analyses supporting design choices 9) Single Event Upset (SEU) Design

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL155	3.23.0-6	<ul style="list-style-type: none"> 10) Subsystem Modes of Operation <ul style="list-style-type: none"> c) S&MA <ul style="list-style-type: none"> 1) Subsystem Parts Selection, De-rating Criteria, Radiation Hardness, Qualification, and Failure Mode and Effects Analysis (FMEA) Plans 2) Subsystem Safety, Quality Control, Reliability and Redundancy 3) Subsystem Materials and Processes 4) Subsystem Single Point Failure Modes as well as critical design areas which may be life limiting d) Spacecraft <ul style="list-style-type: none"> 1) Mechanical/Structural Design and Analyses 2) Electrical, Thermal, Optical/Radiometric Design and Analyses 3) Software Requirements and Design, structure, logic flow diagrams, Central Processing Unit (CPU) loading, design language and development systems 4) Data rates, Telemetry List, and Command List 5) Sub-System-Level Error Budgets, including error allocations to subsystem and components 6) System grounding plan for spacecraft and GFP instrument power, signal, and shield lines. Indicate method for electrical bonding of the units on the spacecraft structure. 7) Subsystem heritage design versus new design table or matrix, with supporting rationale 8) EMI/EMC/ESD subsystem design/analyses to meet system requirements 9) Thruster location and orientation utilization table e) Ground Support Equipment <ul style="list-style-type: none"> 1) Ground Support Equipment (GSE) Design 2) GSE heritage, COTS, and modifications to them if applicable f) Integration & Test <ul style="list-style-type: none"> 1) Design Verification, Test Flow and Calibration, and Testing 2) Life Testing
SCCDRL156	3.24	3.24 PDR Data Package
SCCDRL157	3.24.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> DR-03 2. <u>Title:</u> PDR DATA PACKAGE 3. <u>Use:</u> The PDR is the first major review of the detailed design and is normally held prior to the preparation of formal design drawings. The PDR is held when the design is advanced sufficiently to begin some bread board testing and/or the fabrication of design models. 4. <u>Preparation Information:</u>

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL1180	3.24.0-2	Thirty (30) hardcopies of the PDR Data Package shall be made available at the review.
SCCDRL158	3.24.0-3	Although detailed designs are not expected at this time, the PDR Data Package shall include systems engineering, resource allocations, and design analyses in order to demonstrate compliance with requirements.
SCCDRL159	3.24.0-4	The PDR Data Package shall include a presentation of the design and interfaces by means of block diagrams, signal flow diagrams, schematics, logic diagrams, error budgets, link margins, first interface circuits, packaging plans, configuration and layout sketches, analyses, modeling, and any early results.
SCCDRL160	3.24.0-5	The PDR Data Package shall contain supporting data and analyses for mechanical, power, thermal, and electronic design: load, stress, margins, reliability assessments, should be shown.
SCCDRL161	3.24.0-6	The PDR Data Package shall delineate the status of each document required at PDR as to its acceptability for use as is.
SCCDRL1184	3.24.0-7	The SDR Data Package shall contain the strategy, methods, and plans for performing Verification and Validation.
SCCDRL162	3.24.0-8	The PDR Data Package shall address the following minimum items: <ul style="list-style-type: none">a) Program Management<ul style="list-style-type: none">1) Cost Review2) Schedule Review3) Project risks and mitigation plans4) Subsystem Closure of Actions from Previous Review/Changes since the last review5) Sub-contract status and preliminary status of critical assemblies and sub-assemblies.6) Acronyms and Abbreviationsb) Systems Engineering<ul style="list-style-type: none">1) Requirements, requirement flow-down and traceability2) Requirements Traceability Matrix3) Performance Budgets4) System Performance Budgets and Margins5) Instrument Interfaces and Drivers including analyses supporting6) Ground System Interfaces and Drivers7) Launch Vehicle Interfaces and Drivers8) Contamination Control9) Specification and Drawing Trees10) Mass Properties Report11) Power Profile Report12) GFP Instrument Interface Design, including analyses supporting design choices13) System grounding plan for spacecraft and GFP instrument power and signal lines

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL162	3.24.0-8	<ul style="list-style-type: none"> 14) Compatibility with Atlas and Delta launch vehicle families 15) Single Event Upset (SEU) Design c) S&MA <ul style="list-style-type: none"> 1) Parts Selection, De-rating Criteria, Radiation Hardness, Qualification, and Failure Mode and Effects Analysis (FMEA) Plans 2) Safety, Quality Control, Reliability and Redundancy 3) Materials and Processes 4) Single Point Failure Modes as well as critical design areas which may be life limiting d) Spacecraft <ul style="list-style-type: none"> 1) System and Subsystem Description 2) System Interface Requirements 3) Subsystem Design and Analyses 4) Mechanical/Structural Design and Analyses 5) Electrical, Thermal, Optical/Radiometric Design and Analyses 6) Software Requirements and Design, structure, logic flow diagrams, Central Processing Unit (CPU) loading, design language and development systems, and assurance process. 7) Data rates, Telemetry List, Command List, EMI/EMC 8) System grounding plan for spacecraft and GFP instrument power and signal lines 9) List of long lead items, and of items that may become obsolete, identify those items that must be procured prior to CDR, and provide a plan for procuring these items and all parts. 10) Production plans, issues, and processes e) Ground Support Equipment <ul style="list-style-type: none"> 1) Ground Support Equipment Design f) Integration & Test <ul style="list-style-type: none"> 1) Design Verification, Test Flow and Calibration, and Testing 2) Life Testing Plans g) Launch and Operations <ul style="list-style-type: none"> 1) Launch Vehicle Integration Plans 2) Flight Operations Overview 3) Training Overview and Plans 4) Simulation Support

SCCDRL163 3.25

3.25 Sub-System Critical Design Review (CDR) Data Package

SCCDRL164 3.25.0-1

DESCRIPTION OF REQUIRED DATA1. CDRL No: DR-042. Title: SUB-SYSTEM CRITICAL DESIGN REVIEW (CDR) DATA PACKAGE

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL164	3.25.0-1	<p>3. Use: The Sub-System CDR is held near the completion of the engineering model (if applicable) and bread board development stage. This should be prior to any design freeze and before any significant fabrication activity begins. The CDR presents a final detailed design using substantially completed drawings analyses and bread board/engineering model evaluation testing to show that the design will meet the final performance and interface specifications and the required design objectives. The CDR should represent a complete and comprehensive presentation of the entire design. The CDR should include all of the items specified for a PDR, updated to the final present stage of development process, plus the additional data requirements described below in the “4. Preparation Information:” block below. It provides detailed analysis of the physical design of each electrical, electronic, and electromechanical component in the spacecraft bus system. It provides detailed analysis of all spacecraft subsystems.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL118	3.25.0-2	Twenty (20) hardcopies of the Sub-System CDR Data Package shall be made available at the review.
SCCDRL165	3.25.0-3	The Sub-System CDR Data Package shall present the final design and interfaces by means of block diagrams, power flow diagrams, signal flow diagrams, Field-of-View diagrams, interface circuits, layout drawings, software logic flow and timing diagrams, design language, modeling and simulation results, bread board and engineering model test results and changes required to the design the presented at the PDR.
SCCDRL166	3.25.0-4	The Sub-System CDR Data Package shall present final estimates of weight, power, and volume.
SCCDRL167	3.25.0-5	The Sub-System CDR Data Package shall present final calculations for mechanical loads, stress, torque margins, thermal performance, radiation design and expected lifetime.
SCCDRL168	3.25.0-6	The Sub-System CDR Data Package shall present final software requirements and updated system performance estimates.
SCCDRL169	3.25.0-7	The Sub-System CDR Data Package shall present parts selection, de-rating criteria, and screening results, calculated reliability and the results of a Failure Modes and Effects Analysis (FMEA).
SCCDRL170	3.25.0-8	<p>The Sub-System CDR Data Package shall address the following minimum items:</p> <ul style="list-style-type: none"> a) Program Management <ul style="list-style-type: none"> 1) Subsystem Cost Review 2) Subsystem Schedule Review 3) Subsystem Risk Review 4) Subsystem Closure of Actions from Previous Review/Changes since the last review 5) Acronyms and Abbreviations b) Systems Engineering <ul style="list-style-type: none"> 1) Subsystem requirements, requirement flow-down and traceability 2) Subsystem Requirements Traceability Matrix 3) Subsystem Performance Budgets 4) Subsystem Contamination Control 5) Subsystem Specification and Drawing Trees

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL170	3.25.0-8	<ul style="list-style-type: none"> 6) Subsystem Mass Properties Report 7) Subsystem Power Profile Report 8) Subsystem GFP Instrument Interface Design, including analyses supporting design choices 9) Single Event Upset (SEU) Design 10) Subsystem Modes of Operation c) S&MA <ul style="list-style-type: none"> 1) Subsystem Parts Selection, De-rating Criteria, Radiation Hardness, Qualification, and Failure Mode and Effects Analysis (FMEA) Plans 2) Subsystem Safety, Quality Control, Reliability and Redundancy 3) Subsystem Materials and Processes 4) Subsystem Single Point Failure Modes as well as critical design areas which may be life limiting 5) Subsystem manufacturing plans, processes, and procedures d) Spacecraft <ul style="list-style-type: none"> 1) Mechanical/Structural Design and Analyses 2) Electrical, Thermal, Optical/Radiometric Design and Analyses 3) Software Requirements and Design, structure, logic flow diagrams, Central Processing Unit (CPU) loading, design language and development systems 4) Data rates, Telemetry List, and Command List 5) Sub-System-Level Error Budgets, including error allocations to subsystem and components 6) System grounding plan for spacecraft and GFP instrument power and signal lines 7) Subsystem heritage design versus new design table or matrix, with supporting rationale 8) EMI/EMC/ESD subsystem design/analyses to meet system requirements 9) Thruster location and orientation utilization table e) Ground Support Equipment <ul style="list-style-type: none"> 1) Ground Support Equipment (GSE) Design 2) GSE heritage, COTS, and modifications to them if applicable f) Integration & Test <ul style="list-style-type: none"> 1) Design Verification, Test Flow and Calibration, and Testing 2) Life Testing
SCCDRL171	3.26	3.26 CDR Data Package
SCCDRL172	3.26.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> DR-05 2. <u>Title:</u> CDR DATA PACKAGE 3. <u>Use:</u> The CDR is held near the completion of the engineering model (if applicable)

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL172	3.26.0-1	and bread board development stage. This should be prior to any design freeze and before any significant fabrication activity begins. The CDR presents a final detailed design using substantially completed drawings analyses and bread board/engineering model evaluation testing to show that the design will meet the final performance and interface specifications and the required design objectives. The CDR should represent a complete and comprehensive presentation of the entire design. The CDR should include all of the items specified for a PDR, updated to the final present stage of development process, plus the additional data requirements described below in the "4. Preparation Information:" block below. It provides detailed analysis of the physical design of each electrical, electronic, and electromechanical component in the spacecraft bus system. It provides detailed analysis of all spacecraft subsystems.
		4. <u>Preparation Information:</u>
SCCDRL117 9	3.26.0-2	Thirty (30) hardcopies of the CDR Data Package shall be made available at the review.
SCCDRL173	3.26.0-3	The CDR Data Package shall present the final design and interfaces by means of block diagrams, power flow diagrams, signal flow diagrams, interface circuits, layout drawings, software logic flow and timing diagrams, design language, modeling results, bread board and engineering model test results and changes required to the design the presented at the PDR.
SCCDRL174	3.26.0-4	The CDR Data Package shall present final estimates of weight, power, and volume.
SCCDRL175	3.26.0-5	The CDR Data Package shall present final calculations for mechanical loads, stress, torque margins, thermal performance, radiation design and expected lifetime.
SCCDRL176	3.26.0-6	The CDR Data Package shall present final software requirements and updated system performance estimates.
SCCDRL177	3.26.0-7	The CDR Data Package shall present parts selection, de-rating criteria, and screening results, calculated reliability and the results of a Failure Modes and Effects Analysis (FMEA).
SCCDRL178	3.26.0-8	The CDR Data Package shall address the following minimum items: <ul style="list-style-type: none">a) Program Management<ul style="list-style-type: none">1) Cost Review2) Schedule Review3) Project risks and mitigation plans4) Subsystem Closure of Actions from Previous Review/Changes since the last review5) Sub-contract status and preliminary status of critical assemblies and sub-assemblies.6) Acronyms and Abbreviationsb) Systems Engineering<ul style="list-style-type: none">1) Requirements, requirement flow-down and traceability2) Requirements Traceability Matrix3) Performance Budgets4) System Performance Budgets and Margins5) Instrument Interfaces and Drivers including analyses supporting

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL178	3.26.0-8	<ul style="list-style-type: none">6) Ground System Interfaces and Drivers7) Launch Vehicle Interfaces and Drivers8) Contamination Control9) Specification and Drawing Trees10) Mass Properties Report11) Power Profile Report12) GFP Instrument Interface Design, including analyses supporting design choices13) System grounding plan for spacecraft and GFP instrument power and signal lines14) Compatibility with Atlas and Delta launch vehicle families15) Single Event Upset (SEU) Designc) S&MA<ul style="list-style-type: none">1) Parts Selection, De-rating Criteria, Radiation Hardness, Qualification, and Failure Mode and Effects Analysis (FMEA) Plans2) Safety, Quality Control, Reliability and Redundancy3) Materials and Processes4) Single Point Failure Modes as well as critical design areas which may be life limitingd) Spacecraft<ul style="list-style-type: none">1) System and Subsystem Description2) System Interface Requirements3) Subsystem Design and Analyses4) Mechanical/Structural Design and Analyses5) Electrical, Thermal, Optical/Radiometric Design and Analyses6) Software Requirements and Design, structure, logic flow diagrams, Central Processing Unit (CPU) loading, design language and development systems, and assurance process.7) Data rates, Telemetry List, Command List, EMI/EMC8) System grounding plan for spacecraft and GFP instrument power and signal lines9) List of long lead items, and of items that may become obsolete, identify those items that must be procured prior to CDR, and provide a plan for procuring these items and all parts.10) Production plans, issues, and processese) Ground Support Equipment<ul style="list-style-type: none">1) Ground Support Equipment Designf) Integration & Test<ul style="list-style-type: none">1) Design Verification, Test Flow and Calibration, and Testing2) Life Testing Plansg) Launch and Operations

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL178	3.26.0-8	<ol style="list-style-type: none"> 1) Launch Vehicle Integration Plans 2) Flight Operations Overview 3) Training Overview and Plans 4) Simulation Support
SCCDRL179	3.27	3.27 Pre-Environmental Review (PER) Data Package
SCCDRL180	3.27.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> DR-06 <li>2. <u>Title:</u> PRE-ENVIRONMENTAL REVIEW (PER) DATA PACKAGE <li> <p>3. <u>Use:</u> The PER is required prior to the start of formal environmental testing. The purpose of the PER is to evaluate the planned test/calibration program and test flow to assure that it meets the program needs and to assure that a proper baseline of performance of the satellite to be tested has been established, and the satellite is ready to begin a qualification test program to demonstrate end-to-end or system performance. All performance liens, waivers, action items, malfunction reports and open items should be closed or dispositioned. Could-Not-Duplicate (CND) items should not be closed and their discussion or risk assessment should include what fault tree was done, possible causes, testing/on-orbit impacts, as well as “can we see it” in the follow-on test phases.</p> <p>Following a successfully completed PER and the close-out of any remaining items, the hardware is ready to begin its environmental qualification or acceptance test program.</p> <li>4. <u>Preparation Information:</u>
SCCDRL117	3.27.0-2	Thirty (30) hardcopies of the PER Data Package shall be made available at the review.
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SCCDRL181	3.27.0-3	<p>The PER Data Package shall address the following minimum items.</p> <ol style="list-style-type: none"> <li>a) Changes since the Critical Design Review <li>b) Program Status and General Test Readiness <li>c) Test Plans and Procedures <li>d) Test Objectives/Conditions/Levels/Configuration <li>e) Test Facilities and Certification <li>f) Test Fixtures and Support Equipment <li>g) Instrumentation <li>h) Success/Abort Criteria <li>i) Test Flow including: Calibration, Number of Thermal/Vacuum Cycles, where the CPTs will be performed and thermal analysis showing that thermal test objectives can be met, and length of time required for transitions. <li>j) Compliance with or Status of Test Verification Matrix <li>k) Schedule <li>l) Documentation Status

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SCCDRL181	3.27.0-3	<ul style="list-style-type: none"> m) Functional and Environmental Test History of the Hardware n) Product Assurance and Safety o) Previous Anomalies, Deviations, Waivers, and their resolution p) Identification of Residual Risk Items q) Open Items and plans for close-out r) Final Calibration s) Mass Properties Report t) Power Profile Report u) Trend Analysis Reports
SCCDRL182	3.27.0-4	The PER Data Package shall present the test verification matrix, including measurement tolerances, stimuli, contamination control, and results from the Comprehensive Performance Test (CPT) along with the final results of any life tests.
SCCDRL183	3.27.0-5	The PER Data Package shall present failure free operating time on the item to be tested.
SCCDRL184	3.28	3.28 Satellite Pre-Shipment Review (PSR) Data Package
SCCDRL185	3.28.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> DR-07 2. <u>Title:</u> SATELLITE PRE-SHIPMENT REVIEW (PSR) DATA PACKAGE 3. <u>Use:</u> The PSR occurs prior to the shipment of the satellite to its destination. The purpose of the PSR is to assure the design of the satellite has been validated through the environmental qualification and/or acceptance test program, that all deviations, waivers and open items have been satisfactorily dispositioned and that the satellite, along with all the required documentation and operation procedures, is ready for shipment. <p style="margin-left: 40px;">Satisfactory completion of the pre-shipment and the close-out of any actions from the review indicate the item is ready for shipment.</p> 4. <u>Preparation Information:</u>
SCCDRL117 7	3.28.0-2	Thirty (30) hardcopies of the PSR Data Package shall be made available at the review.
SCCDRL186	3.28.0-3	<p>The PSR Data Package shall address the following minimum items.</p> <ol style="list-style-type: none"> a) Any rework/replacement of hardware, regression testing, or test plan changes should be highlighted during the test flow discussions b) Compliance with the test verification matrix c) Measured Test Margins versus Design Estimates d) Demonstrate Qualification/Acceptance Temperature Margins e) Any data which has been trended to identify compliance with specification should be presented, especially if there has been a change or drift to the trend. f) Total failure-free operating time of the item g) Could-Not-Duplicate failures should be presented along with assessment of the problem

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL186	3.28.0-3	<p>and the residual risk that may be inherent in the item</p> <ul style="list-style-type: none"> h) Project assessment of any residual risk i) Shipping Containers, Monitoring/Control Plans and Mode of Transportation j) Ground Support Equipment Status k) Post Shipment Plans l) Launch Preparation Plan m) Identification of all approved satellite waivers n) Post Storage Data o) Trend Analysis Reports
SCCDRL202	3.28.0-4	The PSR Data Package shall demonstrate and document results of system testing, alignment, calibration and end item performance.
SCCDRL203	3.28.0-5	The PSR Data Package shall present the solutions to all problems encountered during the environmental test and validation program and the solution rationale.
SCCDRL204	3.29	3.29 Satellite Storage Review (SSR) Data Package
SCCDRL205	3.29.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> DR-08 2. <u>Title:</u> SATELLITE STORAGE REVIEW (SSR) DATA PACKAGE 3. <u>Use:</u> The SSR occurs prior to the storage of the satellite, if required. The purpose of the SSR is to assure the design of the satellite has been validated through the environmental qualification and/or acceptance test program, that all deviations, waivers and open items have been satisfactorily dispositioned and that the spacecraft, along with all the required documentation and operation procedures, is ready for storage. <p style="margin-left: 40px;">Satisfactory completion of the pre-storage and the generation of a mutually agreeable action item closure plan.</p> 4. <u>Preparation Information:</u>
SCCDRL117 6	3.29.0-2	Thirty (30) hardcopies of the SSR Data Package shall be made available at the review.
SCCDRL206	3.29.0-3	<p>The SSR Data Package shall address the following minimum items.</p> <ul style="list-style-type: none"> a) Any rework/replacement of hardware, regression testing, or test plan changes to be highlighted during the test flow discussions b) Compliance with the test verification matrix c) Measured Test Margins versus Design Estimates d) Demonstrate Qualification/Acceptance Temperature Margins e) Any data which has been trended to identify compliance with specification should be presented, especially if there has been a change or drift to the trend. f) Total failure-free operating time of the item g) Could-Not-Duplicate failures should be presented along with assessment of the problem

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SCCDRL206	3.29.0-3	<p>and the residual risk that may be inherent in the item</p> <ul style="list-style-type: none"> h) Project assessment of any residual risk i) Storage Containers, Monitoring/Control Plans j) Identification of all approved satellite waivers k) Storage test plans l) Facility description/certification
SCCDRL207	3.29.0-4	The SSR Data Package shall demonstrate and document results of system testing, alignment, calibration and end item performance.
SCCDRL208	3.29.0-5	The SSR Data Package shall present the solutions to all problems encountered during the environmental test and validation program and the solution rationale.
SCCDRL209	3.30	3.30 Earned Value Measurement System (EVMS) Plan
SCCDRL210	3.30.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: RM-01 2. <u>Title</u>: EARNED VALUE MEASUREMENT SYSTEM (EVMS) PLAN 3. <u>Use</u>: A fully validated Earned Value Measurement (EVM) system is required as per NPR 7120.5D. It describes the program or project's implementation of its earned value management system. 4. <u>Preparation Information</u>:
SCCDRL211	3.30.0-2	<p>The following references are given for the Earned Value Measurement System (EVMS) Plan:</p> <ul style="list-style-type: none"> a) NPR 7120.5D, Program/Project Management Processes and Requirement b) NFS 1852.234-2, Earned Value Management System c) American National Standards Institute/Electronic Industries Association(ANSI/EIA)748-A
SCCDRL212	3.30.0-3	The EVMS Plan shall be available in hardcopy or electronic media format upon request.
SCCDRL213	3.30.0-4	The EVMS Plan shall demonstrate the use and understanding of the contract's overall financial and project management system with regard to EVMS at all levels of management.
SCCDRL214	3.30.0-5	The EVMS Plan shall identify policies, methods, procedures, and training utilized to meet the requirements of NPR 7120.5D and NPR 9501.2D (NF533).
SCCDRL215	3.30.0-6	The EVMS Plan and supporting documentation shall describe the implementation of the contractor's earned value management system.
SCCDRL216	3.30.0-7	The EVMS Plan shall address processes for managing technical scope, schedule, cost and risk; for conducting variance analysis; and for developing ongoing and comprehensive estimates at completion.
SCCDRL217	3.30.0-8	This EVMS Plan shall address the flow down of requirements to all major subcontracts consistent with the criteria and requirements defined in NPR 7120.5D.
SCCDRL218	3.30.0-9	The EVMS Plan shall ensure that the system provides for the results of all analyses based on EVM to be linked to or associated with the contractor's Risk Management System (as applicable).

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SCCDRL219	3.30.0-10	The EVMS Plan shall be revised at the Government's request, if a change in the EVM system architecture occurs or in the event of a major contract modification.
SCCDRL220	3.30.0-11	Where the contractor does not have a certified EVMS, the EVMS Plan shall be submitted for review and include a projected timeline with milestones to reach final certification.
SCCDRL221	3.31	3.31 Integrated Baseline Review (IBR) Data Package
SCCDRL222	3.31.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> RM-02 2. <u>Title:</u> INTEGRATED BASELINE REVIEW (IBR) DATA PACKAGE 3. <u>Use:</u> An IBR is a joint assessment conducted by the Government PM and the contractor to verify the realism and accuracy of the PMB (Performance Measurement Baseline). This involves verifying the technical content of the baseline and assessing the realism and accuracy of the related resources (performance budget and Spacecraft Master Schedule. The IBR is unlike the VR [Validation Review] that focuses on EVMS compliance with ANSI/EIA-748. Instead the IBR focuses on assessing the realism of the baseline. (DoD EVM Implementation Guide (October 2006), Section 2.4.1, p. 55). 4. <u>Preparation Information:</u>
SCCDRL223	3.31.0-2	<p>The following references are given for the Integrated Baseline Review (IBR) Data Package:</p> <ol style="list-style-type: none"> a) NPR 7120.5D, NASA Program and Project Management Processes and Requirement b) NFS 1852.234-2, Earned Value Management System c) Department of Defense Earned Value Management Implementation Guide (EVMIG) (http://guidebook.dcmamil/79/EVMIG%20MAR%2007.doc) October 2006)
SCCDRL224	3.31.0-3	An IBR Data Package shall be submitted in accordance with the IBR objectives stated above.
SCCDRL225	3.31.0-4	<p>The IBR Data Package shall contain the following:</p> <ol style="list-style-type: none"> a) Program/Business Management and Control Account Notebooks that incorporates the data products requested by the Project Office (hard copy and electronic copy) b) A baselined electronic version of the Spacecraft Master Schedule c) Contractor Earned Value Process Documentation (hardcopy and electronic) d) Two months of EV Performance data <p><u>Typical Content of Integrated Baseline Review Notebooks should include the following:</u></p> <p>Note: Most of these documents are simply ongoing operational documents gathered together into one notebook. Some documents will already reside in the EVMS Plan.</p> <p><u>Program Management Data Notebook:</u></p> <ol style="list-style-type: none"> a) Suggested notebook and presentation content: <ol style="list-style-type: none"> 1) Earned Value Management (EVM) Top Level Authority 2) Brief overview of EVM process. 3) Organization Charts -flow down as needed including EVM from subcontracts 4) Internal communication and action planning structure

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SCCDRL225	3.31.0-4	<ul style="list-style-type: none"> 5) Top Level Planning and Baseline assumptions 6) Program Percentages (Level of Effort versus Discrete) 7) Program WBS 8) Program Element of Cost (EOC) Resource Allocation Matrix (RAM) 9) Top Level Program Work Authorization and CAP 10) Program technical scope -flow down from SOW to Managers and Control Account Management (CAM) 11) Estimate at Completion (EAC) assumptions if different from negotiated Budget at Completion (BAC) values 12) Contract Performance Report (CPR) Submittals 13) Program Schedule <ul style="list-style-type: none"> i) Top level with vertical and horizontal traceability ii) Critical path 14) Risk Management approach <ul style="list-style-type: none"> i) Current Top Risks ii) Integrated Product Team (IPT) Risk list and Self Assessment Procedures 15) Management Reserve levels and approach 16) Undistributed budgets, if any, and their work assignments 17) Funding Profile 18) Subcontractor Management Plan, if applicable <ul style="list-style-type: none"> i) Management review or reporting cycle ii) Technical/Schedule/Cost/Risk Plan and Status iii) EVM flow-down iv) IBR results v) Any other key programmatic
		<u>Control Account Management (CAM) Data Notebook:</u>
		a) Data content specific to the Control Account or Integrated Product Team
		<u>Technical Scope/Cost</u>
		a) Organization chart for the Cost Account (CA)
		b) RAM (show location in RAM with budget amounts)
		c) Location in Contract Statement of Work
		d) Work Authorization Documentation: trace to authorized budget
		1) Show how work gets authorized from high to low levels
		e) Time Phased Control Account Plan
		1) Work Packages (WP) and Planning Packages (PP)
		2) Resource loading of task: WP and PP
		f) Baseline Metrics
		1) Phased dollars by element of cost breakdown

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SCCDRL225	3.31.0-4	2) Phased workforce profiles (Full Time Employees) g) Labor Reports <u>Schedules</u> a) Flow-down of intermediate schedule into detailed schedules b) Including any program critical path c) Key handoffs d) Schedule Metrics
		<u>Risk List</u> a) Current or anticipated risks in this CA or IPT
		<u>Earned Value Methodology</u> a) EV techniques and rationale b) Cost performance report (>= 2 months) c) Variance analysis reporting if applicable d) Internal communication and action planning
SCCDRL226	3.32	3.32 Contract Performance Report
SCCDRL227	3.32.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> RM-03 2. <u>Title:</u> CONTRACT PERFORMANCE REPORT 3. <u>Use:</u> The Contractor Performance Report (CPR) provides the monthly status of performance data and estimates at complete, identifies approved changes to the Performance Measurement Baseline, and reports variances and projected variances at complete including explanatory analysis. 4. <u>Preparation Information:</u>
SCCDRL110	3.32.0-2 9	The following references are given for the Contract Performance Report: a) NPR 7120.5D, NASA Program and Project Management Processes and Requirement b) NFS 1852.234-2, Earned Value Management System c) DI-MGMT-81466A, Contract Performance Report dtd 3/30/2005 < https://acc.dau.mil/CommunityBrowser.aspx?id=19544 > d) Department of Defense Earned Value Management Implementation Guide (EVMIG) (< http://guidebook.dema.mil/79/EVMIG%20MAR%2007.doc > October 2006)
SCCDRL228	3.32.0-3	The CPR shall include data pertaining to all authorized contract work, including both priced and un-priced effort that has been authorized at a not-to-exceed amount in accordance with the Contracting Officer's direction.
SCCDRL229	3.32.0-4	The CPR shall separate direct and indirect costs and identify elements of cost for all direct reporting.

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SCCDRL230	3.32.0-5	The CPR shall include Formats 1 -5, down to a WBS Level 4. A lower level of reporting may be required for elements that are classified as technical, schedule, or cost risk areas. For Formats 2 and 4, the organizational category will be to at least one level below the project's program manager.
SCCDRL231	3.32.0-6	Earned value performance measurement data for Government and/or contractor-identified medium-and high-risk WBS items shall be reported on Format 1 of the monthly CPR until such time as both Government project management and the Contractor agree that they no longer represent medium or high risks.
SCCDRL232	3.32.0-7	The CPR shall be at a level where the risk resides in the WBS. For medium-and high-risk elements lower than Level 4, specific narrative variance analyses are not required unless specified as special interest.
SCCDRL233	3.32.0-8	To ensure an integrated approach to risk management, the data provided by this CPR DID shall be in consonance with the Work Breakdown Structure (WBS), Integrated Master Schedule (IMS), Risk Management Processes, Plans and Reports (where required), Probabilistic Risk Assessment Processes and Reports (where required), the Cost Analysis Data Requirement (CADRe) and the Monthly/Quarterly Contractor Financial Management Reports (533/Q).
SCCDRL234	3.32.0-9	The Financial Management Reports shall include reconciliation between the 533M/Q and the Contractor Performance Report. This reconciliation may be included within the required CPR Formats.
SCCDRL235	3.32.0-10	Excepted as noted elsewhere in this DID, the CPR formats shall be completed according to the instructions outlined in DI-MGMT-81466A and the following forms: Format 1 (DD Form 2734/1); Format 2 (DD Form 2734/2); Format 3 (DD Form 2734/3); Format 4 (DD Form 2734/4); and Format 5 (DD Form 2734/5). Samples of these forms are available at: https://acc.dau.mil/CommunityBrowser.aspx?id=19543 . Format 5: Variance analysis thresholds which, if exceeded, require problem analysis, narrative explanations and corrective action plan descriptions for all level three and other special interest WBS elements (in the previous paragraph). GOES-R variance analysis thresholds will initially be 10% (+or -) of both current and cumulative cost and schedule variance to date. The variance analysis thresholds may change once the GOES-R Project personnel evaluate the contractor's schedule and cost performance, and risk. Special emphasis should be placed in the variance analysis on cost and schedule growth linked to technical risks (e.g., technology development efforts; design engineering; integration; complexity; project management; systems engineering; duration constraints) identified by both the government and contractor.
SCCDRL236	3.32.0-11	The CPR shall be submitted electronically and followed up with a signed paper copy.
SCCDRL237	3.32.0-12	The American National Standards Institute (ANSI) X12/XML standards (transaction sets 839 for cost and 806 for schedule), the United National Electronic Data Interchange for Administration, Commerce and Transport (EDIFACT, http://www.unece.org/trade/untdid/) equivalent, or any other electronic delivery method deemed acceptable to the GOES-R Project Office shall be used for Electronic Data Interchange.
SCCDRL238	3.32.0-13	Electronic copies shall be capable to being downloaded into wInsight.
SCCDRL239	3.33	3.33 Financial Management Reports
SCCDRL240	3.33.0-1	DESCRIPTION OF REQUIRED DATA
		1. <u>CDRL No:</u> RM-04
		2. <u>Title:</u> FINANCIAL MANAGEMENT REPORTS
		3. <u>Use:</u> To provide data necessary for a) projecting costs and hours to ensure that dollar and labor resources realistically support project and program schedules; b)

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SCCDRL240	3.33.0-1	evaluating contractors' actual cost and fee data in relation to negotiated contract value, estimated costs, and budget forecast data; c) planning, monitoring, and controlling project and program resources; and d) accruing cost in NASA's accounting system. (per NPD 9501.2D)
4. <u>Preparation Information:</u>		
SCCDRL241	3.33.0-2	The following references are given for the Financial Management Reports: <ul style="list-style-type: none"> a) NPD 9501.2D, NASA Contractor Financial Management Reporting b) Financial Management Reporting (GSFC 52.242-90) c) NASA Contractor Financial Management Reporting(1852.242-73)
SCCDRL242	3.33.0-3	The Monthly and Quarterly Financial Management Reports shall be prepared in accordance with the NASA Contractor Financial Management Reporting (1852.242-73) clauses and as supplemented by Financial Management Reporting (GSFC 52.242-90).
SCCDRL243	3.33.0-4	Financial Management Reports shall be provided down to WBS level 4. A lower level of reporting may be required for elements that are identified as technical, schedule, cost and risk areas and to support occasional special analyses (GAO or IG audits, project-level Cost Analysis Data Requirements).
SCCDRL244	3.34	3.34 Cost Analysis Data Requirement (CADRe)
SCCDRL245	3.34.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> RM-05 2. <u>Title:</u> COST ANALYSIS DATA REQUIREMENT (CADRe) 3. <u>Use:</u> The Cost Analysis Data Requirement (CADRe) documents the programmatic, technical, and life cycle cost information for Category I and Category II Flight Systems and Ground Support Projects. It is the NASA version of the Department of Defense Cost Analysis Requirements Document (CARD). The CADRe is for both internal project use and for independent cost estimating. <p>The NASA Project Manager is responsible for the CADRe. Typical projects will make five CADRe submissions across the project life cycle (see page 8 at http://ceh.nasa.gov/downloadfiles/Web%20Links/CADRe%20Info.ppt). The CADRe requirement for the GOES-R Project is flowed down through this DID.</p> <p>The CADRe is comprised of three parts:</p> <ol style="list-style-type: none"> a) Part A contains general descriptive information about the project. The Part A template below provides the necessary guidance. b) Part B contains hardware and software technical parameters necessary to estimate the project's life cycle cost. The Part B template below provides the necessary guidance. c) Part C contains the project's life cycle cost estimate (LCCE). Part C represents the Project's cost estimate and the Project Manager is responsible for collecting the inputs from the various participants including Full Cost elements and submitting an integrated cost estimate.
4. <u>Preparation Information:</u>		

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SCCDRL246	3.34.0-2	<p>The following references are given for the Cost Analysis Data Requirement (CADRe):</p> <ul style="list-style-type: none"> a) NPR 7120.5D, NASA Program and Project Management Processes and Requirements b) NASA Cost Estimating Handbook (www.keh.nasa.gov)
SCCDRL247	3.34.0-3	<p>The required CADRe data for submission by the Contractor shall be CADRe Part B spreadsheet technical data required for the GOES-R Project to complete the full CADRe and some detailed cost data to support Part C. Most of these data will be available through technical documents presented at the PDR, CDR, and cost data provided through NF533 and Contractor Performance Reports. The Part B Template and other information are available at keh.nasa.gov.</p>
SCCDRL248	3.35	3.35 Manpower Report
SCCDRL249	3.35.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: RM-06 2. <u>Title</u>: MANPOWER REPORT 3. <u>Use</u>: To provide assurance the Contractor's internal cost and schedule performance are consistent and controlled effectively 4. <u>Preparation Information</u>:
SCCDRL250	3.35.0-2	<p>The Manpower Report shall list by name all individuals who charged to the GOES-R WBS and the hours charged by each individual by WBS.</p>
SCCDRL251	3.36	3.36 Spacecraft Master Schedule
SCCDRL252	3.36.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: RM-07 2. <u>Title</u>: SPACECRAFT MASTER SCHEDULE 3. <u>Use</u>: For understanding and mapping out in detail the most efficient way of melding together the design, test, hardware, and software elements of the flight equipment, GSE, S/C integration, data analyses and support functions, and documentation at the required program delivery times. <p style="margin-left: 40px;">Schedule reports are used to plan, monitor, communicate status, and control all activities, including pertinent resources and facilities, necessary to accomplish assigned tasks in compliance with the GOES R spacecraft statement of work (SOW).</p> 4. <u>Preparation Information</u>:
SCCDRL253	3.36.0-2	<p>The Spacecraft Master Schedule shall provide the basis for reporting schedule status to the GOES Project Office.</p>
SCCDRL113	3.36.0-3 2	<p>Vertical traceability between the Master, Intermediate and Detailed networks and schedules should be established and maintained including a proper revisions process during the performance of this contract.</p>
SCCDRL254	3.36.0-4	<p>The following schedule reports (in tabular form and electronic media) shall be provided monthly as described.</p> <ul style="list-style-type: none"> a) Master Logic Network and Master Schedule: A time phased schedule portraying all

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SCCDRL254	3.36.0-4	<p>significant events, activities, and milestones of the program. It reflects the overall time allocated to meet specific requirements and establishes the ground rules for implementing the total program. It summarizes the schedule data and status information contained in the intermediate level logic network schedules and includes baseline as well as actual/forecast start and finish dates for all subassemblies, significant activities, events and milestones. Provide a master schedule bar chart, clearly depicting the critical path(s) and suitable for view graph presentation to management.</p> <p>b) Intermediate Logic Network and Schedules: The logic network schedules are an expansion of the master schedule and reflect all appropriate WBS elements. Intermediate Level Logic Network Schedules provide:</p> <ol style="list-style-type: none">1) Sufficient detail to permit identification of the elements necessary for overall accomplishment.2) Time phase the work elements of the WBS.3) Identify major interfaces between project organizations, functional departments, and associate contractors.4) Establish controlled intermediate milestones to adequately monitor progress.5) For each task/activity, the baseline start and completion dates; the current expected/planned start and completion dates, the number of work days required to accomplish the task, and the amount of float/slack in work days for each task, a unique activity identification number for each task, and a task description.6) The critical path derived from the intermediate level logic network schedules. <p>c) Detail schedules: These logic network and/or bar chart schedules are an expansion of the intermediate level logic network schedules and reflect all cost account plan activity (discrete effort only) schedules.</p> <p>d) NASA directed change implementation schedules: Stand alone bar chart schedules clearly identifying all tasks associated with implementing a specific NASA directed change (design through incorporation of the directed change into hardware, software, firmware, and associated documentation). The change schedule provided by the contractor once, and then the changes incorporated into the detail, intermediate and master schedules.</p> <p>e) Monthly schedule analysis narrative: A monthly narrative report describing the overall schedule position of the GOES spacecraft based on schedule float/slack analysis for each major subsystem/subassembly/assembly and compare current month completion date/float for that element with that of the prior month. The primary critical path explained along with possible work-around and/or schedule risk mitigation plans being considered to maintain the schedule.</p> <p>f) A log book identifying all schedule changes (task additions, deletions, duration adjustments, changes to logic) to the schedule baseline documentation and provided to the NASA GOES Project Office upon request.</p>

SCCDRL255 3.37

3.37 Configuration Management Plan

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SCCDRL256	3.37.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> CM-01 2. <u>Title:</u> CONFIGURATION MANAGEMENT PLAN 3. <u>Use:</u> Defines the contractor's configuration management system (including policies and procedures) that will be implemented for the GOES-R spacecraft project 4. <u>Preparation Information:</u>
SCCDRL257	3.37.0-2	The Configuration Management Plan shall be prepared in accordance with the Contractor's practices.
SCCDRL258	3.37.0-3	The Configuration Management Plan shall describe in detail all configuration management processes, methods, and procedures the contractor intends to use on the GOES-R Spacecraft Project.
SCCDRL259	3.37.0-4	The Configuration Management Plan shall describe how hardware configuration management is accomplished and how consistency between product definition, the product's configuration, and the configuration management records is achieved and maintained throughout the applicable phases of the product's life cycle by the contractor. Note: The Software CM Plan is specifically called out as part of the Software Management Plan
SCCDRL260	3.37.0-5	<p>The Configuration Management Plan shall describe the contractor's approach, methodology and application of configuration management principles and practices and include the following:</p> <ol style="list-style-type: none"> a) General product definition and scope b) Description of configuration management activities and procedures for each of the following configuration management functions: <ol style="list-style-type: none"> 1) Configuration Planning and Management 2) Configuration Identification 3) Configuration Change Management 4) Configuration Status Accounting 5) Configuration Verification and Audit 6) Configuration Management of digital data c) Organization, roles, responsibilities and resources d) Definition of terms e) Programmatic and organizational interfaces f) Deliverables, milestones, and schedules g) Subcontract flow down
SCCDRL261	3.38	3.38 Configuration Item Identification List
SCCDRL262	3.38.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> CM-02 2. <u>Title:</u> CONFIGURATION ITEM IDENTIFICATION LIST 3. <u>Use:</u> To identify all configuration items (CI) and computer software configuration items (CSCI) used on the GOES-R Spacecraft and to

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SCCDRL262	3.38.0-1	<p>correlate those CI/CSCI to their specifications and requirements documents.</p> <p>To establish a structure for controlling the configuration of the spacecraft by identifying all Configuration Items (CI) and Computer Software Configuration Items (CSCI) used on the program and correlating those CI/CSCI to their Specification and test requirements documents.</p>
4. <u>Preparation Information:</u>		
SCCDRL263	3.38.0-2	The Configuration Item Identification List shall identify all CIs and CSCIs.
SCCDRL264	3.38.0-3	<p>The Configuration Item Identification List shall be organized and broken down as follows:</p> <ol style="list-style-type: none"> a) All system level CI and CSCI. b) All subsystem level CI and all CI/CSCI within each subsystem.
SCCDRL265	3.38.0-4	<p>The Configuration Item Identification List shall provide the following information for each CI listed:</p> <ol style="list-style-type: none"> a) Assigned CI Number. b) The CI top drawing number. c) The CI nomenclature. d) The applicable specification number. For those CI not governed by a specification, the word "NONE" entered in this column. e) Acceptance test procedure number and, if qualification tested, the qualification test procedure number. If the CI is neither acceptance nor qualification tested, the functional test procedure number should be entered in this column.
SCCDRL266	3.38.0-5	<p>The Configuration Item Identification List shall provide the following information for each CSCI listed:</p> <ol style="list-style-type: none"> a) Assigned CSCI Number b) The CSCI nomenclature. c) The NPR 7150.2 Classification assigned to the CSCI. d) The applicable software requirements specification number. e) Indication of whether any part of the CSCI is safety critical. f) Acceptance test procedure number and, if qualification tested, the qualification test procedure number. If the CSCI is neither acceptance nor qualification tested, the functional test procedure number should be entered in this column.
SCCDRL267	3.38.0-6	The Configuration Item Identification List shall be prepared in the contractor's format.
SCCDRL268	3.39	3.39 Drawing Tree

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SCCDRL269	3.39.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> CM-03 2. <u>Title:</u> DRAWING TREE 3. <u>Use:</u> For ready reference list of all GOES-R Satellite and GSE drawings. 4. <u>Preparation Information:</u>
SCCDRL270	3.39.0-2	The Drawing Tree shall list all drawings for the GOES-R Satellite and separately for the GSE.
SCCDRL271	3.39.0-3	The Drawing Tree shall be organized and identified to serve as a ready reference list.
SCCDRL272	3.39.0-4	The Drawing Tree shall identify drawings by name and number.
SCCDRL273	3.39.0-5	The Drawing Tree shall include a brief description of each drawing.
SCCDRL274	3.40	3.40 Document Tree
SCCDRL275	3.40.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> CM-04 2. <u>Title:</u> DOCUMENT TREE 3. <u>Use:</u> For ready reference list of all GOES-R Satellite and GSE documents. 4. <u>Preparation Information:</u>
SCCDRL276	3.40.0-2	The Document Tree shall list all documents for the GOES-R Satellite and separately for the GSE.
SCCDRL277	3.40.0-3	The Document Tree shall be organized and identified to serve as a ready reference list.
SCCDRL278	3.40.0-4	The Document Tree shall identify documents by name and number.
SCCDRL279	3.40.0-5	The Document Tree shall include a brief description defining the scope of each document.
SCCDRL280	3.41	3.41 Configuration Control Board (CCB) Documentation
SCCDRL281	3.41.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> CM-05 2. <u>Title:</u> CONFIGURATION CONTROL BOARD (CCB) DOCUMENTATION 3. <u>Use:</u> To permit visibility of all changes in configured items (CI) and controlling documentation proposed by the contractor. 4. <u>Preparation Information:</u>
SCCDRL282	3.41.0-2	The CCB Documentation shall include the CCB Agenda, Data Packages, and Minutes.
SCCDRL283	3.41.0-3	The CCB Agenda shall include the date, time, location, subject, sponsor, and change control number of the items to be reviewed by the board.
SCCDRL284	3.41.0-4	The CCB Data Packages shall be attached for each change with the precise format and content that will be reviewed by the contractor's board.

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SCCDRL285	3.41.0-5	The CCB Data Packages shall contain all relevant background material (including written agreements and memos between the Government and the contractor) and complete technical supporting analyses.
SCCDRL286	3.41.0-6	For the purpose of the CCB Documentation Data Item Description, the term CCB shall mean the contractor's program-level CCB and any sub-board which is empowered to authorize the final disposition of an engineering change.
SCCDRL287	3.41.0-7	The CCB Minutes shall include the date, time, location, item subject, change control number, and CCB disposition of the changes reviewed.
SCCDRL288	3.41.0-8	The CCB Minutes shall include a list of actions generated from the CCB for each change
SCCDRL289	3.41.0-9	The CCB Minutes shall include the date it is to be completed.
SCCDRL290	3.41.0-10	The CCB Documentation shall include the change classification and affectivity for approved changes.
SCCDRL291	3.41.0-11	The CCB Documentation shall include a reason(s) when changes are disapproved.
SCCDRL292	3.42	3.42 Configuration Change Requests (CCR) Class I
SCCDRL293	3.42.0-1	DESCRIPTION OF REQUIRED DATA
		<ol style="list-style-type: none"> 1. <u>CDRL No:</u> CM-06 2. <u>Title:</u> CONFIGURATION CHANGE REQUESTS (CCR) CLASS I 3. <u>Use:</u> Class I changes are to be used as a vehicle for orderly processing of change requests to appropriate level of approval authority for disposition. 4. <u>Preparation Information:</u>
SCCDRL294	3.42.0-2	Class I Configuration Change Requests shall document proposed changes impacting form, fit, function, cost, schedules or performance per the Configuration Management Plan.
SCCDRL295	3.43	3.43 Configuration Change Requests (CCR) Class II
SCCDRL296	3.43.0-1	DESCRIPTION OF REQUIRED DATA
		<ol style="list-style-type: none"> 1. <u>CDRL No:</u> CM-07 2. <u>Title:</u> CONFIGURATION CHANGE REQUESTS (CCR) CLASS II 3. <u>Use:</u> Class II changes are to be used as a vehicle for processing of all change requests not classified as Class I to appropriate levels for concurrence. 4. <u>Preparation Information:</u>
SCCDRL297	3.43.0-2	Class II Change Requests shall document all change requests that are not Class I changes and are not detrimental to the government per the Configuration Management Plan.
SCCDRL298	3.44	3.44 Test Data Analysis System (TDAS) Documentation
SCCDRL299	3.44.0-1	DESCRIPTION OF REQUIRED DATA
		1. <u>CDRL No:</u> IM-01

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SCCDRL299	3.44.0-1	<p>2. <u>Title:</u> TEST DATA ANALYSIS SYSTEM (TDAS) DOCUMENTATION</p> <p>3. <u>Use:</u> The Test Data Analysis System is used as a tool to assist NASA in the review and analysis of all data generated from integrated testing. The TDAS will allow remote review of this data and on site at the contractor's facility.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL300	3.44.0-2	<p>The TDAS Documentation shall include the following items:</p> <ul style="list-style-type: none"> a) TDAS facility description -functional overview of TDAS b) Boundary diagram -indicating NASA/Contractor demarcations c) Network diagram -finalized network configuration w/updated hardware d) Data flow diagram e) Equipment and Rack diagrams f) Hardware inventory g) Software inventory h) Server/work station list: functional role, software, services i) Build documentation for all equipment j) System Security Monitoring & Change Control k) Data archive description primary and backup archive location l) Account Request forms & Procedures for requesting TDAS accounts m) IT Security Management Plan n) System Administration Plan
SCCDRL301	3.45	3.45 TDAS Operations Manual
SCCDRL302	3.45.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <p>1. <u>CDRL No:</u> IM-02</p> <p>2. <u>Title:</u> TDAS OPERATIONS MANUAL</p> <p>3. <u>Use:</u> The TDAS Operations Manual is used to document the policies and procedures required to run the TDAS.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL303	3.45.0-2	<p>The TDAS Operations Manual shall include:</p> <ul style="list-style-type: none"> a) Standard Operating Procedures to run the hardware and software that make up the system, including accessing, reviewing and storage of test data b) Contingency procedures for anomalous operations c) Constraints on hardware and software d) Security policies and procedures required to maintain the integrity of the system
SCCDRL304	3.46	3.46 TDAS Training Package

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SCCDRL305	3.46.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none">1. <u>CDRL No:</u> IM-032. <u>Title:</u> TDAS TRAINING PACKAGE3. <u>Use:</u> The TDAS Training Package will be used to train all designated personnel in the operation of the TDAS.4. <u>Preparation Information:</u>
SCCDRL306	3.46.0-2	<p>TDAS Training Package shall include materials and manuals to cover the following activities:</p> <ol style="list-style-type: none">a) Class room instruction in the operation of the hardware and software that make up the TDAS, including training on the actual TDAS equipment in the TDAS facility.b) Instruction in the various tools developed to assist in data analysisc) Instruction in the security tools and safeguardsd) Procedures for applying for access to the TDASe) Supplemental training for changes or upgrades to the various components of the TDAS
SCCDRL307	3.47	<p>3.47 TDAS Remote User Interface Control Document (ICD)</p>
SCCDRL308	3.47.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none">1. <u>CDRL No:</u> IM-042. <u>Title:</u> TDAS REMOTE USER INTERFACE CONTROL DOCUMENT (ICD)3. <u>Use:</u> The TDAS Remote User ICD will be used in support of satellite testing to define the interface for remote user access to the TDAS data.4. <u>Preparation Information:</u>
SCCDRL309	3.47.0-2	<p>The TDAS Remote User ICD shall define the interface for the exchange of GOES generated command data and spacecraft/instrument telemetry produced during satellite integration and test to TDAS remote users.</p>
SCCDRL311	3.48	<p>3.48 Risk Management Plan</p>
SCCDRL312	3.48.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none">1. <u>CDRL No:</u> RK-012. <u>Title:</u> RISK MANAGEMENT PLAN3. <u>Use:</u> The purpose of the Risk Management Plan is to define the continuous risk management process by which the developer identifies, evaluates and minimizes the risks associated with program, project, and/or mission goals.4. <u>Preparation Information:</u>
SCCDRL313	3.48.0-2	<p>The Risk Management Plan (RMP) shall be a configuration-controlled document.</p>

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SCCDRL314	3.48.0-3	<p>The RMP shall include:</p> <ol style="list-style-type: none"> a) Overview of Introduction. Specify the program/project risk objectives and policy toward risk. Explain the purpose, scope, assumptions, constraints, key ground rules, and policy pertaining to the project continuous risk management process. b) Overview of Process. Provide an overview of the continuous risk management process and information flow; describe how the continuous risk management process integrates and relates to other project management and system engineering activities. Include general risk mitigation strategies to be employed throughout project life cycle. c) Organization. Show the organization, roles, and responsibilities of program, project, customer, and supplier key personnel with regard to continuous risk management. Document how team members will be trained in the application of risk management methodology. d) Process Details. Provide the risk management process details and related procedures, methods, tools, and metrics. Include here, or in an appendix, the specific methodologies to be used for activities of continuous risk management: identify, analyze, plan, track, control, communicate and document. Include the process to be used for continual assessment of the project Risk Profile. Describe how risk information will be communicated both internally to the project staff and throughout the NASA management chain. e) Documentation of Risks. Specify the format and data elements that will comprise the project Risk List (and/or Risk Database), how configuration control will be applied, and how the list will be used and updated. Tell how team members will be able to access the current list at any time. Include in the RMP the initial set of identified risks and the action plan (for research, acceptance, tracking, or mitigation) for each risk. f) Key System Interfaces: Describe the relationship and interfaces of the continuous risk management process to lessons learned reporting, System Safety analyses, reliability/probabilistic risk analyses, schedule, financial, Earned Value Management, and other business reporting systems g) Appendix. Material that is too detailed or sensitive to be placed in the main body of text may be placed in an appendix or included as reference. Include the appropriate reference in the main body of the text. Appendices may be bound separately, but are considered to be part of the document. Include an alphabetized list of the definitions for abbreviations and acronyms used in this document. Include an alphabetized list of definitions for special terms used in the document, i.e., terms used in a sense that differs from or is more specific than the common usage for such terms.
SCCDRL315	3.48.0-4	The Appendix in the RMP shall be placed under configuration control.
SCCDRL316	3.49	3.49 Risk List
SCCDRL317	3.49.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: RK-02 2. <u>Title</u>: RISK LISTS 3. <u>Use</u>: The purpose of the Risk List is to document information on risks associated with program, project, and/or mission goals. 4. <u>Preparation Information</u>:
SCCDRL318	3.49.0-2	The Risk List shall be a configuration-controlled document.

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SCCDRL319	3.49.0-3	<p>The Risk List shall include:</p> <ol style="list-style-type: none"> a) Description of the risk, including primary causes and contributors, actions embedded in the program or project to date to reduce or mitigate it, and information collected for tracking purposes. b) Primary consequences should the undesired event occur. c) Estimate of the probability of occurrence (qualitative or quantitative) together with the uncertainty of the estimate and the effectiveness of any implemented risk mitigation measures. d) Additional risk tracking information including risk originator (person who initially identified the risk), risk classification (e.g., technical, cost, or schedule), risk owner (person responsible for tracking/mitigating risk), and risk timeframe (time period when mitigation action needs to be initiated). e) Potential additional risk mitigation measures, which include a comparison of the cost of risk mitigation versus the cost of occurrence multiplied by the probability of occurrence. f) Characterization of a risk as “acceptable” or closed that is supported by a rationale (with the concurrence of the Government) that all reasonable mitigation options (within cost, schedule, and technical constraints) have been instituted and/or that risk has been reduced.
SCCDRL320	3.50	3.50 Systems Engineering Management Plan
SCCDRL321	3.50.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SE-01 2. <u>Title:</u> SYSTEMS ENGINEERING MANAGEMENT PLAN 3. <u>Use:</u> The contractor approved Systems Engineering Management Plan (SEMP) will serve as the contractor’s planned method of identifying and conducting all system engineering related activities under this contract. 4. <u>Preparation Information:</u>
SCCDRL322	3.50.0-2	The Systems Engineering Management Plan shall describe the overall lifecycle including the major systems engineering activities for each phase.
SCCDRL323	3.50.0-3	The Systems Engineering Management Plan shall describe critical decisions and activities.
SCCDRL324	3.50.0-4	The Systems Engineering Management Plan shall include approach for performing the system engineering activities especially where subcontracts are planned.
SCCDRL325	3.50.0-5	The Systems Engineering Management Plan shall describe methods utilized for communicating systems engineering activities, progress, status and results. (Include any periodic meeting or working groups.)
SCCDRL326	3.50.0-6	The Systems Engineering Management Plan shall list communication tools that are planned (e.g. meeting makers, tracking tools, email, and websites).
SCCDRL327	3.50.0-7	The Systems Engineering Management Plan shall describe the trade study methodology.
SCCDRL328	3.50.0-8	The Systems Engineering Management Plan shall describe the types of mathematical and or simulation models to be used.

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SCCDRL329	3.50.0-9	The Systems Engineering Management Plan shall describe the scope, approach, methods, and procedures of the system used to implement the management of requirements.
SCCDRL330	3.50.0-10	The Systems Engineering Management Plan shall document how the contractor will track and trace requirements to all levels.
SCCDRL331	3.50.0-11	The Systems Engineering Management Plan shall document the reporting mechanism to the government of requirements tracing to all levels.
SCCDRL332	3.50.0-12	The Systems Engineering Management Plan shall describe the format planned and tools to be used for documenting and tracking the requirements.
SCCDRL333	3.50.0-13	The Systems Engineering Management Plan shall define when requirements identification is due and when formal configuration control is expected to start.
SCCDRL334	3.50.0-14	The Systems Engineering Management Plan shall describe what tools are planned to track verification status.
SCCDRL335	3.50.0-15	The Systems Engineering Management Plan shall list the resource budgets Systems Engineering will track, the margin philosophy, who will collect the inputs, how often they will be collected, and when allocation of the budgets are due and when they will be placed under formal configuration management.
SCCDRL336	3.50.0-16	The Systems Engineering Management Plan shall define the role of systems engineering in risk management and how the systems engineering management plan and the risk management plan are related.
SCCDRL337	3.50.0-17	The Systems Engineering Management Plan shall define the reliability philosophy and what reliability analyses are planned, who is responsible and how the analyses are to be accomplished, including any special tools.
SCCDRL338	3.50.0-18	The Systems Engineering Management Plan shall define when and how often reliability analyses are to be performed.
SCCDRL339	3.50.0-19	The Systems Engineering Management Plan shall define which system engineering reviews are planned.
SCCDRL340	3.50.0-20	The Systems Engineering Management Plan shall define what systems engineering documentation is planned and when it is to be placed under formal configuration management.
SCCDRL341	3.50.0-21	The Systems Engineering Management Plan shall describe the method to archive and distribute System Engineering information generated during the course of the lifecycle.
SCCDRL342	3.50.0-22	The Systems Engineering Management Plan shall define the Systems Engineering Organization Chart and Job Responsibilities.
SCCDRL343	3.50.0-23	The Systems Engineering Management Plan shall include a top-level schedule for the system engineering activities including major work previously identified.
SCCDRL344	3.51	3.51 Spacecraft Requirements Specification

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SCCDRL345	3.51.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: SE-02 2. <u>Title</u>: SPACECRAFT REQUIREMENTS SPECIFICATION 3. <u>Use</u>: The Spacecraft Requirements Specification assures that the contractor is performing in accordance with the contractual and government Level III requirements. 4. <u>Preparation Information</u>:
SCCDRL346	3.51.0-2	The Spacecraft Requirements Specification shall define the contractor's software and hardware requirements for the spacecraft and Ground Support Equipment in order to assure that the contractor is performing in accordance with the contractual and government Level III requirements.
SCCDRL347	3.51.0-3	The Spacecraft Requirements Specification shall include derived requirements from GOES-R Spacecraft Functional and Performance Specification, the GOES-R GIRD, the Instrument UIIDs, the Spacecraft MAR, and the SOW.
SCCDRL348	3.51.0-4	The lower level Spacecraft Design Specification and Subsystem level specifications shall be directed and controlled by the Spacecraft Requirements Specification.
SCCDRL349	3.51.0-5	The GOES-R Spacecraft Requirements Specification shall be delivered in a DOORS compatible format.
SCCDRL350	3.51.0-6	<p>The GOES-R Spacecraft Requirements Specification shall include a Requirements Traceability Matrix that includes:</p> <ol style="list-style-type: none"> a) An impacts field identifying all systems and subsystems that may be affected by a proposed change to this requirement. b) An interface impacts field identifying all systems and subsystems that may be affected by a proposed change to this requirement due to an interface association. c) Identification of the parent requirement.
SCCDRL113 4	3.51.0-7	The content of the Spacecraft Requirements Specification should be in accordance with MIL-STD-490, or the contractor equivalent format
SCCDRL351	3.52	3.52 Spacecraft Detailed Design Specification
SCCDRL352	3.52.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: SE-03 2. <u>Title</u>: SPACECRAFT DETAILED DESIGN SPECIFICATION 3. <u>Use</u>: The Spacecraft Detailed Design Specification delineates the contractors design for the GOES-R Spacecraft. It establishes the top level design and interface specification(s) placed on the Spacecraft. 4. <u>Preparation Information</u>:
SCCDRL353	3.52.0-2	The Spacecraft Detailed Design Specification shall provide the hardware and software specifications to be used by the contractor to direct the development of the Instrument and ground support equipment.

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SCCDRL354	3.52.0-3	The Spacecraft Detailed Design Specification shall consist of separate specifications as appropriate.
SCCDRL355	3.52.0-4	The Spacecraft Detailed Design Specification shall include engineering requirements down to the subassembly level and as needed to the part level.
SCCDRL356	3.52.0-5	The Spacecraft Detailed Design Specification shall include interface requirements internal and external to spacecraft. (Separate Interface Requirements Specifications should be used where appropriate.)
SCCDRL357	3.52.0-6	The Spacecraft Detailed Design Specification shall include operational parameters and requirements.
SCCDRL358	3.52.0-7	The Spacecraft Detailed Design Specification shall include safety and assurance requirements.
SCCDRL359	3.52.0-8	The Spacecraft Detailed Design Specification shall include software requirements to the component level.
SCCDRL360	3.52.0-9	The Spacecraft Detailed Design Specification shall include unique identifiers for each
SCCDRL361	3.52.0-10	The Spacecraft Detailed Design Specification shall include traceability matrices identifying parent requirements and any requirements impacted by a change in the requirement.
SCCDRL362	3.53	3.53 Spacecraft Performance Verification Plan
SCCDRL363	3.53.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SE-04 2. <u>Title:</u> SPACECRAFT PERFORMANCE VERIFICATION PLAN 3. <u>Use:</u> Provides a description of the spacecraft performance and verification test program, and describes the specific tests and/or analysis, calibrations, and alignments that will collectively demonstrate that the hardware and software complies with the system performance and environmental requirements. 4. <u>Preparation Information:</u>
SCCDRL364	3.53.0-2	The Spacecraft Performance Verification Plan shall describe the approach (e.g. test, analysis) that will be used to verify that the hardware and software complies with system requirements.
SCCDRL365	3.53.0-3	The Spacecraft Performance Verification Plan shall address the environmental verification program either as a separate section or as a separate stand alone document.
SCCDRL366	3.53.0-4	The environmental verification section of the Spacecraft Performance Verification Plan shall describe the contractor's approach for qualification and acceptance testing. It is intended to provide general test philosophy and an overview of the system-level environmental testing to be performed to demonstrate adequacy of the spacecraft for flight, (e.g., vibration, shock, thermal vacuum).
SCCDRL367	3.53.0-5	If performance or environmental verification is performed at level of assembly other than spacecraft, the Spacecraft Performance Verification Plan shall describe the relationship of the test and analysis to spacecraft level verification.
SCCDRL368	3.53.0-6	The Spacecraft Performance Verification Plan shall address any limitations in the ability to verify any performance or environmental requirement along with a risk assessment of the limitations in verifying those requirements.

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SCCDRL369	3.53.0-7	Where requirements are verified by analysis, the Spacecraft Performance Verification Plan shall include objectives, a description of the mathematical model, assumptions on which the models will be based, required output, criteria for assessing the acceptability of the results, the interaction with related test activity, if any, and requirements for reports.
SCCDRL370	3.53.0-8	The Spacecraft Performance Verification Plan shall contain detailed test flow sequence charts showing sequence of development and spacecraft level testing, including integration and qualification/acceptance test activities for the spacecraft and spacecraft unit/component.
SCCDRL371	3.53.0-9	The Spacecraft Performance Verification Plan shall indicate in the test flows where Comprehensive and Limited Performance Tests will be conducted.
SCCDRL372	3.53.0-10	The Spacecraft Performance Verification Plan shall provide descriptions of the tests and activities that will be performed at the spacecraft contractor's facility and at the launch site (descriptions include: level of assembly, configuration of item, objectives, facilities, instrumentation, safety consideration, contamination control, test phases and profile, necessary functional operations, personnel responsibilities, and requirements for procedures and reports).
SCCDRL373	3.53.0-11	The Spacecraft Performance Verification Plan shall include a description of when and how frequently all redundant parts and cross-strapped paths will be tested during each test activity.
SCCDRL374	3.53.0-12	The Spacecraft Performance Verification Plan shall address the plan for the verification of all previously flown and qualified hardware, including identification of additional verification testing that is required.
SCCDRL375	3.53.0-13	The Spacecraft Performance Verification Plan shall include a recommended post-launch test plan.
SCCDRL376	3.53.0-14	The Spacecraft Performance Verification Plan shall provide a description of all ground support facilities and equipment planned along with a plan for certification of any lifting equipment.
SCCDRL377	3.53.0-15	The Spacecraft Performance Verification Plan shall include a description of the operational methodology for controlling documenting and approving activities not part of the approved test procedure
SCCDRL378	3.53.0-16	The Spacecraft Performance Verification Plan shall address the controls to prevent accidents that could damage or contaminate hardware or facilities, or cause personal injury.
SCCDRL379	3.53.0-17	The Spacecraft Performance Verification Plan shall address the controls for real-time decision-making mechanisms for continuation or suspension of testing after malfunction, and a method for determining retest requirements, including the assessment of the validity of previous tests.
SCCDRL380	3.53.0-18	The Spacecraft Performance Verification Plan shall contain a Performance Verification Matrix that maps performance and design requirements/parameters against the test verification methods to prove compliance with the specification requirements.
SCCDRL117 5	3.53.0-19	The Spacecraft Performance Verification Plan's Performance Verification Matrix shall incorporate the Software Requirements Verification (traceability) Matrix discussed in the Software Test Plan
SCCDRL381	3.53.0-20	The Performance Verification Matrix in the Spacecraft Performance Verification Plan shall include columns of information to identify and/or describe the following minimum information: <ul style="list-style-type: none"> a) Parameter description b) Specification requirement c) Method of compliance verification (test, life test, demonstration, analysis, inspection). d) Level of Assembly where compliance will be verified (spacecraft, unit, assembly) e) Identification of design phase and integration level at which verification is performed.

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SCCDRL381	3.53.0-20	<ul style="list-style-type: none"> f) System Performance Verification Test Plan number g) Test Procedure number or identifier h) Test Report Number
SCCDRL382	3.53.0-21	The environmental verification section of the Spacecraft Performance Verification Plan shall contain an Environmental Test Matrix compatible with the matrix in Figure 2.1-1 of the GSFC General Environmental Verification Specification.
SCCDRL383	3.54	3.54 Spacecraft to Instrument ICDs
SCCDRL384	3.54.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SE-05 2. <u>Title:</u> SPACECRAFT TO INSTRUMENT ICDs 3. <u>Use:</u> These documents are used to define the interfaces between the spacecraft and the GFP instruments. The purpose of the ICD is to communicate the specific details of all possible inputs and potential outputs between the Spacecraft and the GFP instruments. In this way, independent teams can develop the connecting systems which use the interface specified, without regard to how other systems will react to data and signals which are sent over the interface. For example, the ICD includes information about the size and format of the data, but not the <i>meaning</i> of the data, in the sense that the ICD describes how the recipient should react to received data. 4. <u>Preparation Information:</u>
SCCDRL385	3.54.0-2	A separate Spacecraft to Instrument ICD shall document each GFP Instrument interface.
SCCDRL386	3.54.0-3	<p>The Spacecraft to Instrument ICDs shall:</p> <ol style="list-style-type: none"> a) Include requirements from the Instrument Description Documents (IDDs) provided by the GFP Instrument contractors. b) Specify the GFP Instrument mechanical, electrical, thermal, contamination, command and data handling interfaces with the spacecraft c) Specify the GFP Instrument to Spacecraft integration and test requirements d) Specify the Spacecraft GSE to GFP Instrument GSE interface for all GSE components
SCCDRL387	3.54.0-4	The Spacecraft to Instrument ICDs' revisions shall provide updated interface environments when more accurate data is available.
SCCDRL388	3.54.0-5	<p>The Spacecraft to Instrument ICDs shall contain the following:</p> <ol style="list-style-type: none"> a) A title page including the specification number, date, title and approval certifications. <ol style="list-style-type: none"> 1) Title to include nomenclature of both interfacing systems 2) Approval certifications that provision for office title, signatory name, signature and approval date b) Scope that includes: <ol style="list-style-type: none"> 1) System/segment interface identification. This section briefly describes the overall system, segment, or equipment to be addressed by the interface specification. It includes a matrix diagram identifying each interfacing item, and show the origin and

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SCCDRL388	3.54.0-5	<p>destination of each interface.</p> <ol style="list-style-type: none"> 2) Documentation organization. This section describes the manner in which the specification is structured, and provides guidance on its use. 3) Limitations and restrictions. This section describes any limitations or restrictions to the use of the specification. <p>c) Applicable documents. All documents having a bearing on the system and segment interfaces are identified in sub-sections by the title, number, and applicable data. This includes:</p> <ol style="list-style-type: none"> 1) Government specifications, standards, and handbooks. 2) Interface control documentation. This includes all related of referenced interface control drawings and interface control specifications. 3) Other documentation. This includes any applicable industry or other documentation. <p>d) Interface requirements. This section provides the detailed description of the interface requirements. Each interface is separately covered in its own subsection, and includes:</p> <ol style="list-style-type: none"> 1) Interface identification and description 2) Functional interface specification details by parameter. 3) Physical interface specification details by parameter. 4) Environmental details by parameter. <p>e) Quality assurance. This section identifies and defines the inspection and test requirements necessary to verify the designed end product complies with the interface requirements.</p>
SCCDRL113 5	3.54.0-6	<p>In the Spacecraft to Instrument ICDs, the functional interface specification details by parameter shall include:</p> <ol style="list-style-type: none"> a) For electronics, requirements with related tolerances that include: signal characteristics, wave forms, voltage, frequencies, shielding requirements, circuit impedance, current limits and current requirements. b) For power, requirements with related tolerances that include: type of power (AC or DC), frequency characteristics, voltage levels, power ratings (amperes, watts, volt-ampere), wave forms, grounding. c) Optical/electro-optical requirements. d) Human factors and engineering requirements.

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SCCDRL389	3.54.0-7	<p>In the Spacecraft to Instrument ICDs, the physical interface specification details by parameter relating the physical mating of the two systems at a common boundary shall include:</p> <ul style="list-style-type: none"> a) Reproductions of or references to the applicable interface control drawings and installation drawings. b) Dimensions and tolerances of mating surfaces with applicable sizes, shapes, and spacing including flanges, bolt holes, and mounting plates. c) Weight, balance, and center of gravity. d) Materials specifications including dissimilar material requirements. e) Cabling requirements including connectors and routing. f) Applied loads. g) Accessibility including installation and removal clearance. h) Sealing requirements, leakage prevention and detection.
SCCDRL390	3.54.0-8	<p>In the Spacecraft to Instrument ICDs, the environmental details by parameter shall include:</p> <ul style="list-style-type: none"> a) Electromagnetic interfaces, compatibility requirements. b) Vibration envelopes including sine and random c) Shock limits. d) Acceleration limits. e) Acoustic sound pressure limits. f) Temperature limits. g) Noise factors.
SCCDRL391	3.55	<h3>3.55 Spacecraft Communications Services ICDs</h3>
SCCDRL392	3.55.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SE-06 2. <u>Title:</u> SPACECRAFT COMMUNICATIONS SERVICES ICDs 3. <u>Use:</u> The Spacecraft Communications Services ICDs document the details of these interfaces and provide a reference analysis of the RF performance. The interface supports the communication of data between the Space Segment and the ground. Consequently, these Interface Control Documents (ICD): <ul style="list-style-type: none"> a) Identify the required communication links from the spacecraft to the ground b) Establishes functional and performance requirements related to these communication links. 4. <u>Preparation Information:</u>
SCCDRL393	3.55.0-2	<p>The Spacecraft Communications Services ICDs shall address the requirements found in the associated Interface Requirements Documents IRDs:</p> <ol style="list-style-type: none"> 1) 417-R-IRD-0001, RM Version, GOES-R Series, Space Segment (SS) to Ground Located -Command, Control, and Communications Segment (GL-C3S) Interface Requirements Document (IRD). This IRD describes the interface requirements for all

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SCCDRL393	3.55.0-2	signals originating or terminating in the satellite (TT&C and the RAW data link).
		<ol style="list-style-type: none"> 2) 417-R-IRD-0002, RM Version, GOES R Series Space Segment (SS) to Ground Rebroadcast (GRB) Service Interface Requirements Document (IRD) 3) 417-R-IRD-0003, RM Version, GOES-R Series, Space Segment (SS) to Low Rate Information Transmission (LRIT) Service Interface Requirements Document (IRD) 4) 417-R-IRD-0004, RM Version, GOES-R Series, Space Segment (SS) to Emergency Managers Weather Information Network (EMWIN) Interface Requirements Document (IRD) 5) 417 R-IRD-0005, RM Version GOES-R Series, Space Segment (SS) to Data Collection System (DCS) Interface Requirements Document (IRD). This IRD includes both the links to and from the DCPR platforms. 6) 417-R-IRD-0006, RM Version, GOES-R Series, Space Segment (SS) to Search and Rescue (SAR) Service Interface Requirements Document (IRD)
SCCDRL394	3.55.0-3	The Spacecraft Communications Services ICDs shall address the requirements found in the associated IRDs with one ICD delivered for each IRD.
SCCDRL400	3.56	3.56 Satellite Level Instrument Interface INR Analysis and Test Plan
SCCDRL401	3.56.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SE-07 2. <u>Title:</u> SATELLITE LEVEL INSTRUMENT INTERFACE INR ANALYSIS AND TEST PLAN 3. <u>Use:</u> The approach here is that the spacecraft contractor will perform analyses and tests and provide the data required for interface performance assessment and for INR ground processing and performance assessment. The data will be provided to instrument contractors to verify that the physical and data interfaces with the spacecraft comply with specifications. The data will be provided to an operations-ready or prototype version of the ground processing system so that the ground and instrument contractors can jointly verify that INR performance meets requirements. 4. <u>Preparation Information:</u>
SCCDRL402	3.56.0-2	The initial delivery of the Satellite Level Instrument Interface INR Analysis and Test Plan shall include the analysis plans.
SCCDRL403	3.56.0-3	The subsequent delivery of the Satellite Level Instrument Interface INR Analysis and Test Plan shall include the test plans and any updates to the analysis plans.
SCCDRL404	3.56.0-4	<p>The Satellite Level Instrument Interface INR Analysis and Test Plan shall be segregated into the following two sections:</p> <ol style="list-style-type: none"> a) Analysis and Test for Nadir Pointed Instruments b) Analysis and Test for Solar Pointed Instruments

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SCCDRL405	3.56.0-5	The analysis plans for the Satellite Level Instrument Interface INR Analysis and Test Plan shall present descriptions of methods, algorithms, commercial or proprietary tools to be employed, and models.
SCCDRL406	3.56.0-6	The analysis plans for the Satellite Level Instrument Interface INR Analysis and Test Plan shall present frequency cut-off criteria and damping ratios to be employed for various bus or component flexible body modes.
SCCDRL407	3.56.0-7	The analysis plans for the Satellite Level Instrument Interface INR Analysis and Test Plan shall describe how the articulating nature of the solar array is captured in the model.
SCCDRL408	3.56.0-8	The test plans for the Satellite Level Instrument Interface INR Analysis and Test Plan will be developed in cooperation between spacecraft and instrument contractors.
SCCDRL409	3.56.0-9	The test plans for the Satellite Level Instrument Interface INR Analysis and Test Plan shall identify the satellite-level tests necessary to demonstrate compliance with instrument to spacecraft interface requirements.
SCCDRL410	3.56.0-10	The test plans for the Satellite Level Instrument Interface INR Analysis and Test Plan shall identify the duration of the tests, data formats, and the spacecraft/instrument contractor support needed for conducting the tests.
SCCDRL411	3.57	3.57 Satellite Level Instrument Interface INR Analysis Report and Data
SCCDRL412	3.57.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> SE-08 <li>2. <u>Title:</u> SATELLITE LEVEL INSTRUMENT INTERFACE INR ANALYSIS REPORT AND DATA <li>3. <u>Use:</u> The approach here is that the spacecraft contractor will perform analyses and tests and provide the data required for interface performance assessment and for INR ground processing and performance assessment. The data will be provided to instrument contractors to verify that the physical and data interfaces with the spacecraft comply with specifications. The data will be provided to an operations-ready or prototype version of the ground processing system so that the ground and instrument contractors can jointly verify that INR performance meets requirements. <p>This CDRL documents the analysis report and data.</p> <ol style="list-style-type: none"> <li>4. <u>Preparation Information:</u>
SCCDRL413	3.57.0-2	<p>Satellite Level Instrument Interface INR Analysis Report and Data shall be segregated into the following two sections:</p> <ol style="list-style-type: none"> <li>a) Analysis for Nadir Pointed Instruments <li>b) Analysis for Solar Pointed Instruments
SCCDRL414	3.57.0-3	Satellite Level Instrument Interface INR Analysis Report and Data shall present the spacecraft to instrument interface performance for normal on-orbit, momentum unloading, stationkeeping, yaw flip, eclipse, post-eclipse, and all other periods not covered by the itemized list thus presented.
SCCDRL415	3.57.0-4	Satellite Level Instrument Interface INR Analysis Report and Data shall present results to demonstrate the effects of sun declinations.

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SCCDRL416	3.57.0-5	Satellite Level Instrument Interface INR Analysis Report and Data shall contain spacecraft to instrument interface budgets and flow down allocations for all known spacecraft interface errors.
SCCDRL417	3.57.0-6	Satellite Level Instrument Interface INR Analysis Report and Data shall present the rationale to combine the individual error allocations into successive allocation levels up to the overall performance requirement of the specification.
SCCDRL418	3.57.0-7	Satellite Level Instrument Interface INR Analysis Report and Data shall present results indicating the effects of articulating, flexible dynamics the solar array on the pointing stability on the Sun-pointing instruments.
SCCDRL419	3.57.0-8	<p>Satellite Level Instrument Interface INR Analysis Report and Data shall include error allocations for disturbance sources listed below, along with their categorization as static, diurnal or dynamic, with frequency content provided.</p> <ul style="list-style-type: none"> a) Orbit determination errors b) Attitude determination errors c) Bus jitter and sun-pointing attitude stability, in the presence of the disturbances and jitter due to solar array articulation d) Instrument induced disturbances (e.g., instrument scanning, black body calibrations) e) Uncompensated dynamic interactions f) Errors in the estimation of the various compensation signals (e.g., curve fit error for rapidly changing thermal induced errors) g) Thermally induced repeatable and non-repeatable errors (thermal models, mapping methods and software to be delivered for these cases) h) GN&C maneuvers and impacts to instrument interfaces
SCCDRL420	3.58	3.58 Satellite Level Instrument Interface INR Test Report and Data
SCCDRL421	3.58.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SE-09 2. <u>Title:</u> SATELLITE LEVEL INSTRUMENT INTERFACE INR TEST REPORT AND DATA 3. <u>Use:</u> The approach here is that the spacecraft contractor will perform analyses and tests and provide the data required for interface performance assessment and for INR ground processing and performance assessment. The data will be provided to instrument contractors to verify that the physical and data interfaces with the spacecraft comply with specifications. The data will be provided to an operations-ready or prototype version of the ground processing system so that the ground and instrument contractors can jointly verify that INR performance meets requirements. <p style="text-align: center;">This CDRL documents the test report and data.</p> 4. <u>Preparation Information:</u>
SCCDRL422	3.58.0-2	<p>The Satellite Level Instrument Interface INR Test Report and Data shall be segregated into the following two sections:</p> <ul style="list-style-type: none"> a) Tests for Nadir Pointed Instruments b) Tests for Solar Pointed Instruments

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SCCDRL423	3.58.0-3	The Satellite Level Instrument Interface INR Test Report and Data shall contain the results of tests to demonstrate compliance with instrument to spacecraft interface translational acceleration requirements.
SCCDRL424	3.58.0-4	The Satellite Level Instrument Interface INR Test Report and Data shall contain the results of tests to determine actual performance of all interfaces affecting nadir pointed instrument INR performance.
SCCDRL425	3.58.0-5	The Satellite Level Instrument Interface INR Test Report and Data shall contain the results of tests to determine actual performance of all interfaces affecting sun pointed instrument accuracy and stability.
SCCDRL426	3.59	3.59 Schematics and Block Diagrams
SCCDRL427	3.59.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> SE-10 <li>2. <u>Title:</u> SCHEMATICS AND BLOCK DIAGRAMS <li>3. <u>Use:</u> To provide detailed electrical schematic diagrams of all the spacecraft hardware, circuitry, and functions, including harness interfaces and test equipment interfaces. These diagrams will be used during spacecraft integration & test, and orbital operation for problem tracing, anomaly resolution, and procedure review. <li>4. <u>Preparation Information:</u>
SCCDRL114 7	3.59.0-2	Final delivery of the Schematics and Block Diagrams shall reflect the As-Built Satellite configuration.
SCCDRL428	3.59.0-3	The Schematics and Block Diagrams should be presented in small but readable size format. The document should contain as many sheets as needed to ensure that every spacecraft +GFP interface functions are documented. The document should group the schematic diagrams by subsystems or functions for ease of circuit traceability.
SCCDRL429	3.59.0-4	The Schematics and Block Diagrams shall be updated whenever there is a design change.
SCCDRL430	3.59.0-5	The Schematics and Block Diagrams shall be in the contractor's format, except as noted in this DID.
SCCDRL431	3.59.0-6	<p>Electrical Schematic and Block Diagrams, as a minimum, shall include:</p> <ol style="list-style-type: none"> <li>a) Overall system block diagrams, showing all the spacecraft subsystems, including all the GFP instrument interface signals <li>b) Detailed electrical diagrams, showing each spacecraft function such as power, command, telemetry, relay switching, pyrotechnic circuits, and their harness interfaces. The diagrams to contain the as-built input and output circuits of all harness interfaces. These diagrams showing all the GFP instrument/Spacecraft interface circuits and harnesses. The diagrams of the Test equipment to spacecraft electrical interfaces to be documented. <li>c) The harness interface of these detailed schematic diagrams showing the as-built harness configuration (wire gauge, twisted, shielding). The electrical redundancy and cross-strapping of all the spacecraft units to be provided in these schematic diagrams. <li>d) System level grounding diagram, including isolation resistance between all ground returns and a description of all interconnecting power returns, telemetry returns, signal returns, shielding terminations, and chassis grounds for each piece of equipment and for each instrument. The diagrams that include all interfaces to test equipment connected to

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SCCDRL431	3.59.0-6	<p>the spacecraft when the spacecraft is powered on.</p> <ul style="list-style-type: none"> e) The reduced size schematics and block diagrams to be provided in a three-ring notebook (s). f) The detailed block diagrams showing where all telemetry and command data (e.g. AGC, current, on-off status, voltage) originate. g) Digital units (if any) illustrated by their analog equivalent where necessary. Thus an A to D converter can be represented by an A to D box and digital filter by an (analog) filter so that the logic of the digital units can be understood.
SCCDRL432	3.60	3.60 Contamination Control Plan
SCCDRL433	3.60.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SE-11 2. <u>Title:</u> CONTAMINATION CONTROL PLAN 3. <u>Use:</u> <p>To provide a contamination control plan that defines the necessary levels of cleanliness and defines the methods and procedures to be followed to achieve adequate cleanliness and contamination control for the spacecraft with respect to the instrument performance requirements.</p> <p>To define the approach required to maintain cleanliness and contamination control during shipping, spacecraft integration and test, storage, shipping, launch site processing, launch, ascent, and through End of Life.</p> 4. <u>Preparation Information:</u>
SCCDRL434	3.60.0-2	<p>As a minimum, the Contamination Control Plan shall include the following in relation to the Spacecraft and Mission Performance Specification:</p> <ol style="list-style-type: none"> a) Define the beginning-of-life (BOL) and end-of-life (EOL) contamination control requirements for all surfaces that affect instrument or spacecraft performance. Provide a contamination budget delineating the performance degradation for particulate (ground based and on-orbit contributions) and molecular (ground based non-volatile residue and on-orbit outgassing) contaminants as a function of development phase of the spacecraft through EOL. b) The allowable BOL and EOL source rates for molecular sources affecting instrument or thermal control surface performance shall be determined by mass transport analysis. These allowable source rates shall be specified in the CCP along with a plan for how the BOL rates for these sources will be verified prior to launch. c) Identify all flight hardware items to be vacuum baked and certified in order to achieve the overall instrument/spacecraft performance and molecular cleanliness requirements, as impacted from hardware and spacecraft outgassing. Provide the bakeout parameters for configuration of the spacecraft, temperature for bakeout and certification, chamber pressure requirements, location of outgassing monitoring sensors such temperature-controlled quartz crystal microbalances (TQCMs) or equivalent, and acceptable monitored rates of outgassing for the chamber and for the spacecraft. d) Define the contamination mitigation aspects of the design (e.g. material selection, vent design and orientation, baffles, decontamination heaters). Include the verification methodology necessary for achieving the contamination budgets. Describe the techniques for verifying surface cleanliness levels and material outgassing rates. e) Ascertain that materials used in spacecraft hardware design conform to the outgassing screening criteria provided by NASA Reference Publication 1124, entitled, "Outgassing

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SCCDRL434	3.60.0-2	<p>Data for Selecting Spacecraft Materials”. This publication is intended to be used as guidelines for initially screening materials, and it is not intended to be used as a sole pass/fail criteria. Non-conformance’s to the screening criteria shall be submitted for approval through a system consistent with the spacecraft contractor’s Product Assurance Plan for a material’s deviation to these material selection criteria. Materials used in close proximity to critical optics or sensitive thermal control surfaces may require more stringent outgassing requirements and/or limitations on material quantity. The more stringent requirements will be established according to instrument or thermal performance requirements and the spacecraft contamination modeling results.</p> <ul style="list-style-type: none">f) Define the requirements, methods, and procedures required to maintain cleanliness during spacecraft integration, test, and launch site processing. The requirements are to be based upon the most sensitive affected system. Any GSP or LV hardware which comes in contact with the spacecraft must meet the requirements of that flight hardware, including instruments.g) Identify the environmental facility parameters necessary for fabrication, assembly, I & T, and launch operations of the spacecraft. As a minimum, the parameters include airborne particulate room classification, relative humidity, temperature, fallout rates, non-volatile residue (NVR) accumulation, hydrocarbon levels, and garment requirementsh) Provide all cleaning, inspection, and bagging plans/procedures necessary for ground support equipment, interface hardware, and flight hardware for all assemblies during all phases. Provide in the contamination control plan a section for instrument covers or a plan that describes when covers for contamination sensitive instruments are installed or removed through the I&T flow; how the covers removed from the instruments are stored, and the process for removal at launch base prior to encapsulation, and how the removal or installation process is recorded.i) Provide an assessment and methodologies for maintaining and verifying cleanliness during transportation and storage periods of the spacecraft.j) Provide an operation flow chart that identifies when all planned cleanliness inspections, spacecraft bagging, and cleanings will occur from manufacture through launch site processing.k) Describe the methods by which cleanliness requirements are flowed down to the subcontractors and how the subcontractor hardware will be inspected/tested to ensure compliance to all cleanliness requirements.l) Provide a spacecraft specific contamination control training program for all personnel required to work on flight hardware in clean rooms, clean areas, or on clean benches.m) Include a monitoring plan for the spacecraft and integrated exposed instrument surface cleanliness and outgassing requirements for fabrication, assembly, integration & test, spacecraft ground processing and launch site activities (including fairing encapsulation). For on-orbit EOL, provide analyses that demonstrate performance/ cleanliness requirements are met. Describe reporting of contamination levels during the integration and test phase through launch site activities (up to encapsulation and fairing monitoring efforts).n) Provide a purge plan that details the design and construction of a portable purge cart that will provide a two-stage stepdown of a high pressure purge source for all instruments delivered to the spacecraft that require GN2 purge. Describe all components required to satisfy the design and safety requirements for a high purity delivery system, including but not limited to regulators, valves, tubing, fittings, flowmeters, pressure relief devices, purifiers, filters, and the purge lines from the purge cart to the instrument or spacecraft purge interface. Describe the purge line cleanliness procedures and verification methodologies.o) Provide documentation for the purge gas cleanliness/purity to the contamination engineer prior to purge connection/use. Provide a purge gas methodology for the entire

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SCCDRL434	3.60.0-2	<p>spacecraft flow from instrument integration through launch operations.</p> <p>p) Provide a plume analyses from station-keeping maneuvers or orbit transfers that assess any potential degradation to the spacecraft and instrument thermal and optical performance requirements. Consider LV retrorockets and thruster exhaust plume impact on the spacecraft.</p> <p>q) Define any launch or on-orbit constraints necessary to satisfy instrument and spacecraft contamination requirements.</p> <p>r) Provide an approach to the purge system and fairing cleanliness impact on the spacecraft and instrument requirements. Include all purge logistics at the launch site and fairing surface cleanliness, verification, and monitoring relative to spacecraft design differences.</p>
SCCDRL435	3.60.0-3	<p>Define the beginning-of-life (BOL) and end-of-life (EOL) contamination control requirements for all surfaces that affect instrument or spacecraft performance. Provide a contamination budget delineating the performance degradation for particulate (ground based and on-orbit contributions) and molecular (ground based non-volatile residue and on-orbit outgassing) contaminants as a function of development phase of the spacecraft through EOL.</p>
SCCDRL455	3.61	<p>3.61 Spacecraft Contamination Model and Report</p>
SCCDRL456	3.61.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: SE-12 2. <u>Title</u>: SPACECRAFT CONTAMINATION MODEL AND REPORT 3. <u>Use</u>: The Spacecraft Contamination Model and Report will be used to: <ol style="list-style-type: none"> a) Verify the basic spacecraft design minimizes contamination risk to instruments and predict contamination-induced performance degradation of the spacecraft bus surfaces b) Determine allowable outgassing or venting rates needed to meet EOL cleanliness requirements. c) Recommend design modifications if performance problems are found <p>This model will be used to provide the instrument teams with expected contamination fluxes into their instrument apertures, and to verify compliance with mission fluence requirements in the GIRD. This model will be used to optimize vent locations and aid in defining required out-gassing rates for thermal vacuum bake-out.</p> 4. <u>Preparation Information</u>:
SCCDRL457	3.61.0-2	<p>The Spacecraft Contamination Model and Report shall use modeling programs with the same fidelity as the following: TRASYS for the geometrical model and view factors, SPACE II for direct flux calculations, and MOLFLUX for return flux.</p>
SCCDRL459	3.61.0-3	<p>As a minimum, the Spacecraft Contamination Model and Report shall include the following contamination inputs: vents, thruster firings and out-gassing from materials and components.</p>
SCCDRL460	3.61.0-4	<p>The Spacecraft Contamination Model and Report shall:</p> <ol style="list-style-type: none"> a) Verify compliance with on-orbit fluxes into instrument apertures requirements of the GIRD including time dependencies of said fluxes and assumptions that went into the calculations.

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SCCDRL460	3.61.0-4	<ul style="list-style-type: none"> b) Provide the total mission fluence over 15 years. c) Calculate performance degradation of spacecraft components due to contamination fluxes and deposition onto spacecraft surfaces. Include all assumptions involved with this calculation. d) Provide plots of the geometrical model from several views so that all contamination sources and contamination -sensitive surfaces used in the model can be seen. Identify the vent and thruster locations on the plots. e) Provide for each vent the equations and set of data or assumption used in the model to describe the flow rate and direction of the vent effluent. f) Identify the types and “sizes” (i.e. thrust levels) of thrusters used in the model. For each thruster type and size, provide the equation or set of data that was used in the model to describe the thruster plume. Include the “backflow region”, i.e. angles greater than 90 degrees from plume centerline. For each thruster type and size, identify the molecular species emitted by the thruster and give the mole fraction of each species present. Describe the thruster firing sequenced used in the model, e.g. how many, burn time. g) Provide a list of out-gassing sources (materials or components) used as inputs to the model, including out-gassing rate, time dependence of rate and support information on rate chosen. h) Identify the species of molecular contaminants used in the model and justify why these species were chosen. i) Consider all sources that have a transport path to contamination sensitive locations. This includes, but is not limited to, the following: solar array(s) interior and exterior materials, the spacecraft panel surfaces, all appendages, spacecraft MLI, and venting from the internal spacecraft. j) Be conducted using approved software programs to determine depositions on sensitive surfaces, contaminant fluences at sensitive locations such as apertures, and provide a particulate analysis that predicts redistribution during launch, ascent and on-orbit mission phases. k) Include launch vehicle (LV) contribution to the satellite. l) Include: theory assumptions, results of all runs/cases, geometric models, view factors, sticking coefficients, temperature defined outgassing rates, and accumulations.

SCCDRL111 3.62
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3.62 Electrostatic Discharge (ESD) Control Plan

SCCDRL462 3.62.0-1

DESCRIPTION OF REQUIRED DATA

1. CDRL No: SE-13
2. Title: ELECTROSTATIC DISCHARGE (ESD) CONTROL PLAN
3. Use: The Electrostatic Discharge (ESD) Control Plan will be used to evaluate the proposed design to ensure that data product outages due to ESD events are minimized.
4. Preparation Information:

SCCDRL463 3.62.0-2

The Electrostatic Discharge (ESD) Control Plan **shall** describe the planned design features that will be used to minimize the occurrence of ESD events in orbit.

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL464	3.62.0-3	The ESD Control Plan shall document processes and procedures used to assure that all manufacturing, inspection, testing and other processes will not compromise mission objectives for quality and reliability due to ESD events including on orbit.
SCCDRL114 8	3.62.0-4	The ESD Control Plan shall document the plan for routine monitoring of floor activities and violations and implementation of corrective action.
SCCDRL465	3.63	3.63 Radiation Shielding and Dose Analysis Report
SCCDRL466	3.63.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> SE-14 <li>2. <u>Title:</u> RADIATION SHIELDING AND DOSE ANALYSIS REPORT <li>3. <u>Use:</u> Provide a radiation and shielding analysis to ensure that all spacecraft components/parts on box-to-box basis will be compatible with the expected space radiation environment for the required mission life as defined in “The Radiation Environmental for Electronic Devices on GOES-R Series Satellites”, 417-R-0027, August, 2006. <li>4. <u>Preparation Information:</u>
SCCDRL467	3.63.0-2	<p>The Radiation Shielding and Dose Analysis Report shall include a description of the model used to generate radiation dose predictions, including:</p> <ol style="list-style-type: none"> <li>a) Description of the shielding analysis software. <li>b) Description of the satellite shield geometry and composition, as modeled. <li>c) List of assumptions and approximations. <li>d) Estimate of model prediction accuracy.
SCCDRL468	3.63.0-3	The Radiation and Shielding and Dose Analysis Report shall include a tabular listing of predicted ionizing dose at end-of-spacecraft life for each spacecraft unit.
SCCDRL469	3.63.0-4	The Radiation and Shielding and Dose Analysis Report shall define the proposed parts that will require additional shielding to be compatible with the required spacecraft mission life.
SCCDRL470	3.64	3.64 Mission Assurance Implementation Plan

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL471	3.64.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: MA-01 2. <u>Title</u>: MISSION ASSURANCE IMPLEMENTATION PLAN 3. <u>Use</u>: To define the contractor's systematic approach to, and processes used in, the management, development, testing (verification, validation, and qualification), documentation, configuration management, and quality assurance of the Spaceflight Hardware, Software and Ground test equipment. <p>The following reference this DID:</p> <ol style="list-style-type: none"> a) Mission Assurance Requirements 417-R-SCMAR-0011 b) SCMAR 3 <ol style="list-style-type: none"> 4. <u>Preparation Information</u>:
SCCDRL472	3.64.0-2	<p>The Mission Assurance Implementation Plan shall address all applicable requirements of relevant quality standard (Q9001). Refer to ISO 10013 Quality Manual Development Guide for further guidelines on preparation of a Mission Assurance Implementation Plan.</p>
SCCDRL473	3.64.0-3	<p>The Mission Assurance Implementation Plan Manual shall contain:</p> <ol style="list-style-type: none"> a) The title, approval page, scope and the field of application b) Table of contents c) Introductory pages about the organization concerned and the manual itself d) The quality policy and objectives of the organization e) The description of the organization, responsibilities and authorities, including the organization responsible for the implementation of all sections of the Mission Assurance Requirements 417-R-Mar 0011 including EEE parts, materials, reliability, safety, assembly and test requirements f) A description of the elements of the quality system, Contractor policy regarding each element and Contractor implementation procedure for each clause or reference (s) to approved quality system procedures; system level procedures that address the implementation of all requirements cited in this document g) A definitions section h) An appendix for supportive data
SCCDRL474	3.64.0-4	<p>Mission Assurance Implementation Plan distribution and changes shall be implemented by a controlled process.</p>
SCCDRL475	3.64.0-5	<p>The Mission Assurance Implementation Plan shall be maintained and updated by the Contractor throughout the life of the contract.</p>
SCCDRL476	3.65	<p>3.65 As-Designed Parts List (ADPL)</p>
SCCDRL477	3.65.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: MA-02 2. <u>Title</u>: AS-DESIGNED PARTS LIST (ADPL)

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)	
SCCDRL477	3.65.0-1	3. <u>Use:</u>	Listing of all parts intended for use in space flight hardware: As-Designed Parts List (ADPL).
		4. <u>Preparation Information:</u>	
SCCDRL478	3.65.0-2	The ADPL shall document parts approved for designed hardware.	
SCCDRL479	3.65.0-3	The ADPL shall be formatted in accordance with the requirements of the GOES-R Spacecraft Mission Assurance Requirements.	
SCCDRL480	3.65.0-4	The ADPL shall follow the Parts Lists Required Fields Table below.	

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Requirements List (CDRL)

SCCDRL480 3.65.0-4

Parts Lists Required Fields Table

FIELD	Required Field for Parts List Type		
	ADPL	PAPL	ABPL
Item Number	X	X	X
Spacecraft Name	X	X	X
Instrument Name	X	X	X
Generic Part Number	X	X	X
Procurement Part Number	X	X	X
Flight Part Number		X	X
Description	X	X	X
Package: Case Style and Number of Pins	X	X	X
Lot Date Code			X
Manufacturer	X	X	X
Cage Code	X	X	X
Distributor	X		
Additional Testing Required	X	X	
Quantity needed	X		X
Quantity Procured	X		
Radiation Hardness Evaluation: TID, Krads	X	X	X
Radiation Hardness Evaluation: SEL, MeV	X	X	X
Radiation Hardness Evaluation: SEU, MeV	X	X	X
Radiation Hardness Evaluation: Displacement Damage	X	X	X
Radiation Data Source: TID	X		
Radiation Data Source: SEE	X		
Notes	X		
PMCB Comments	X	X	
Approval Date	X	X	X
Box Identification	X	X	X
Part Location (Circuit Identifier)			X

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL481	3.65.0-5	Any format for the ADPL, preferably a spreadsheet, may be used provided the required information is included. All submissions to GSFC will include a paper copy and a computer readable form.
SCCDRL482	3.65.0-6	Updates to ADPL shall identify changes from the previous submission.
SCCDRL483	3.66	3.66 As-Built Parts List (ABPL)
SCCDRL484	3.66.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> MA-03 <li>2. <u>Title:</u> AS-BUILT PARTS LIST (ABPL) <li>3. <u>Use:</u> Listing of all parts intended for use in space flight hardware: As-Built Parts List (ABPL). <li>4. <u>Preparation Information:</u>
SCCDRL485	3.66.0-2	The ABPL shall be formatted in accordance with the requirements of the GOES-R Spacecraft Mission Assurance Requirements.
SCCDRL486	3.66.0-3	A separate ABPL shall be submitted for each assembly.
SCCDRL113 6	3.66.0-4	The ABPL shall provide a final compilation of all parts as installed in flight equipment, with additional "as-installed" part information such as manufacturer name, CAGE code, Lot-Date Code, part serial number (if applicable), quantity used and box or board location. The manufacturer's plant specific CAGE code is preferred, but if unknown, the supplier's general cage code is sufficient (See Parts List Required Fields Table).
SCCDRL487	3.66.0-5	The ABPL shall follow the Parts Lists Required Fields Table below.

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Requirements List (CDRL)**

SCCDRL487 3.66.0-5

Parts Lists sRequired Fields Table

FIELD	Required Field for Parts List Type		
	ADPL	PAPL	ABPL
Item Number	X	X	X
Spacecraft Name	X	X	X
Instrument Name	X	X	X
Generic Part Number	X	X	X
Procurement Part Number	X	X	X
Flight Part Number		X	X
Description	X	X	X
Package: Case Style and Number of Pins	X	X	X
Lot Date Code			X
Manufacturer	X	X	X
Cage Code	X	X	X
Distributor	X		
Additional Testing Required	X	X	
Quantity needed	X		X
Quantity Procured	X		
Radiation Hardness Evaluation: TID, Krads	X	X	X
Radiation Hardness Evaluation: SEL, MeV	X	X	X
Radiation Hardness Evaluation: SEU, MeV	X	X	X
Radiation Hardness Evaluation: Displacement Damage	X	X	X
Radiation Data Source: TID	X		
Radiation Data Source: SEE	X		
Notes	X		
PMCB Comments	X	X	
Approval Date	X	X	X
Box Identification	X	X	X
Part Location (Circuit Identifier)			X

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL489	3.66.0-6	Any format for the ABPL, preferably a spreadsheet, may be used provided the required information is included. All submissions to GSFC will include a paper copy and a computer readable form.
SCCDRL490	3.66.0-7	Updates to ABPL shall identify changes from the previous submission.
SCCDRL491	3.67	3.67 Materials and Processes Control Plan
SCCDRL492	3.67.0-1	DESCRIPTION OF REQUIRED DATA
		<ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-04 2. <u>Title:</u> MATERIALS AND PROCESSES CONTROL PLAN 3. <u>Use:</u> Description of developer's approach and methodology for implementing Materials and Processes Control Plan, including flow-down of applicable requirements to sub-developers. 4. <u>Preparation Information:</u>
SCCDRL493	3.67.0-2	The Materials and Processes Control Plan shall describe the contractor's plan or approach for conforming to Materials Program requirements.
SCCDRL494	3.67.0-3	The Materials and Processes Control Plan shall provide detailed procedures for the selection criteria of Materials and Lubricants.
SCCDRL495	3.67.0-4	The Materials and Processes Control Plan shall provide details on the Parts and Materials Control Board (PMCB), including PMCB membership, designation of Chairperson, responsibilities, review and approval procedures, meeting schedules and method of notification, meeting minutes.
SCCDRL496	3.67.0-5	The Materials and Processes Control Plan shall describe PMP tracking methods and approach, including tools to be used such as databases, reports, NASA Parts Selection List (NPSL). Describe system for identifying and tracking PMP approval status.
SCCDRL497	3.67.0-6	The Materials and Processes Control Plan shall describe PMP procurement, processing and testing methodology and strategies. Identify internal operating procedures to be used for, at a minimum, incoming inspections, screening, qualification testing, derating, testing of PMP pulled from stores.
SCCDRL498	3.67.0-7	The Materials and Processes Control Plan shall describe PMP vendor surveillance and audit plan
SCCDRL499	3.67.0-8	The Materials and Processes Control Plan shall describe flow down of PMP requirements to sub-developers
SCCDRL500	3.67.0-9	<p>The Materials and Processes Control Plan shall address the following for flight hardware threaded fasteners that are used in structural or critical applications:</p> <ol style="list-style-type: none"> a) acquisition/supplier control b) documentation/traceability c) receiving inspection/testing
SCCDRL501	3.68	3.68 EEE Parts Control Program Plan
SCCDRL502	3.68.0-1	DESCRIPTION OF REQUIRED DATA
		<ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-05 2. <u>Title:</u> EEE PARTS CONTROL PROGRAM PLAN

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL502	3.68.0-1	<p>3. <u>Use:</u> Description of developer's approach and methodology for implementing Parts Control Program (PCP) Plan, including flow-down of applicable PCP Plan requirements to sub-developers.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL503	3.68.0-2	The PCP Plan shall address all EEE parts program requirements.
SCCDRL504	3.68.0-3	<p>The PCP Plan shall include:</p> <ul style="list-style-type: none"> a) Parts and Materials Control Board (PMCB) operating procedures, membership, responsibilities, authority, meeting schedules, Parts review procedures, Parts approval/disapproval procedures, GSFC involvement, and plans for updating the operating procedures; the definition of the role and authority of each PMCB member; and relationships with various groups within the prime, associate, and sub-developer organizations (see section 11.2 for further information). b) Shelf life control plan (see section 11.4.7.2 for further information). c) Parts application derating (see section 11.4.4 for further information). d) Part vendor surveillance and audit plan (see section 11.5.2 for further information). e) Part qualification plan that describes how parts should be qualified for the intended end item application (see section 11.9 for further information). f) Incoming inspection and test plan (see section 11.4.6 for further information). g) Destructive Physical Analysis (DPA) plan (see section 11.4.7.1 for further information). h) Defective parts controls program. i) PCB coordination and interactions with other program control boards; i.e., CCB, and failure review board (FRB). j) Radiation hardness assurance program plan as required (see section 11.6 for further information). k) ESD control plan. l) Corrosion prevention and control plan. m) Contamination Prevention and Control Plan, as required. n) Standardization of parts program. o) Alternate Quality Conformance Inspection (QCI) and small lot sample plans, as required (see section 11.4.8 for further information). p) Traceability control plan. q) PMCB shall develop, update and maintain a Project Approved Parts List (PAPL).
SCCDRL111	3.69	3.69 Material Usage Agreement / Stress Corrosion Form

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL505	3.69.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-06 2. <u>Title:</u> MATERIAL USAGE AGREEMENT/STRESS CORROSION FORM 3. <u>Use:</u> For usage evaluation and approval of non-compliant materials or lubrication usage. 4. <u>Preparation Information:</u>
SCCDRL506	3.69.0-2	A Materials Usage Agreement (MUA) shall be provided for each non-compliant off-the-shelf-hardware material usage, non-compliant polymeric material out gassing, flammability or toxicity usage and non-compliant inorganic material stress corrosion cracking usage.
SCCDRL507	3.69.0-3	The MUA shall provide as a minimum: material rating, usage agreement number, page number, drawing numbers, part or drawing name, assembly, material name and specification, manufacturer and trade name, use thickness, weight, exposed area, pressure, temperature, exposed media, application, rationale for safe and successful flight, originator's name, project manager's name and date. Table 1 of MSFC-STD-3029 Multi Program/Project Common-Use Document Guidelines for the Selection of Metallic Materials for Stress Corrosion Cracking Resistance in Sodium Chloride Environments Materials, Processes, and Manufacturing Department Metallic Materials and Processes Group lists examples of materials that can be considered for use.
SCCDRL508	3.69.0-4	The off-the-shelf-hardware usage in the MUA shall identify the measures to be used to ensure the acceptability of the hardware such as hermetic sealing, material changes to known compliant materials, vacuum bake-out to the error budget requirements listed in the Contamination Control Plan.
SCCDRL509	3.70	3.70 As-Designed Materials and Lubrication List
SCCDRL510	3.70.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-07 2. <u>Title:</u> AS-DESIGNED MATERIALS AND LUBRICATION LIST 3. <u>Use:</u> Provides data on as-designed material usage. 4. <u>Preparation Information:</u>
SCCDRL511	3.70.0-2	The As-Designed Materials and Lubrication List shall document parts approved for designed hardware.
SCCDRL512	3.70.0-3	The As-Designed Materials and Lubrication List shall be in accordance with figures shown in the GOES-R Spacecraft Mission Assurance Requirements.
SCCDRL513	3.70.0-4	A separate As-Designed Materials and Lubrication List shall be submitted for the Magnetometer with reference to the assembly number.
SCCDRL514	3.71	3.71 As-Built Materials and Lubrication List
SCCDRL515	3.71.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-08 2. <u>Title:</u> AS-BUILT MATERIALS AND LUBRICATION LIST

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL515	3.71.0-1	<p>3. <u>Use:</u> Details the actual configuration of the delivered article(s). Provides data on as-built material usage.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL516	3.71.0-2	The As-Built Materials and Lubrication List shall provide a final compilation of all materials and lubrication used in flight equipment, with additional information such as manufacturer name, CAGE code, quantity required and box or board location. The manufacturer's plant specific CAGE code is preferred, but if unknown, the supplier's general cage code is sufficient
SCCDRL517	3.71.0-3	The As-built Materials and Lubrication List shall be in accordance with figures shown in the GOES-R Spacecraft Mission Assurance Requirements.
SCCDRL518	3.71.0-4	A separate As-built Materials and Lubrication List shall be submitted for the Magnetometer with reference to the assembly number.
SCCDRL519	3.72	3.72 System Safety Program Plan
SCCDRL520	3.72.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <p>1. <u>CDRL No:</u> MA-09</p> <p>2. <u>Title:</u> SYSTEM SAFETY PROGRAM PLAN</p> <p>3. <u>Use:</u> The approved System Safety Program Plan provides a formal basis of understanding between the Range User and Range Safety on how the System Safety Program will be conducted to meet the requirements of AFSPCMAN 91-710 and the NPR 8715.3 NASA Safety Manual, including general and specific provisions.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL521	3.72.0-2	The approved System Safety Program Plan (SSPP) shall account for all contractually required tasks and responsibilities on an item-by-item basis.
SCCDRL522	3.72.0-3	The SSPP shall describe in detail the tasks and activities of system safety management and engineering required to identify, evaluate, and eliminate or control hazards by reducing the associated risk to a level acceptable to Range Safety throughout the system life cycle.
SCCDRL523	3.72.0-4	The SSPP shall provide a detailed SSPP to describe how the project will implement a safety program in compliance with launch range requirements. Integration of system/facility safety provisions into the SSPP is vital to the early implementation and ultimate success of the safety effort.
SCCDRL524	3.72.0-5	<p>The SSPP shall address the following areas:</p> <ul style="list-style-type: none"> a) System safety organization, interfaces, and responsibilities b) System safety methodologies c) Internal safety review process d) Launch site safety e) Verification and operating procedures f) Hazardous operation surveillance g) Accident investigation and reporting h) Operator training and certification

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SCCDRL524	3.72.0-5	<ul style="list-style-type: none"> i) Safety audits j) Monitoring of subcontractors k) Documentation to be provided l) Milestone schedules of all major activities m) Procedure for reporting problems and activity status n) Industrial safety program responsibilities, functions, and interfaces with the system safety program
SCCDRL525	3.73	3.73 Safety Data Package (SDP) / Missile System Pre-Launch Safety Package (MSPSP)
SCCDRL526	3.73.0-1	DESCRIPTION OF REQUIRED DATA
		<ul style="list-style-type: none"> 1. <u>CDRL No:</u> MA-10 2. <u>Title:</u> SAFETY DATA PACKAGE (SDP) / MISSILE SYSTEM PRE-LAUNCH SAFETY PACKAGE (MSPSP) 3. <u>Use:</u> Provides a detailed description of the satellite design sufficient to support hazard analysis results, hazard analysis method, and other applicable safety related information. 4. <u>Preparation Information:</u>
SCCDRL527	3.73.0-2	The first SDP/MSPSP delivery shall contain appropriate launch range safety requirements tailoring (if necessary). *(See applicable launch range and launch vehicle requirements for details).
SCCDRL528	3.73.0-3	The SDP/MSPSP shall include analyses identifying the ground operations hazards associated with the flight system, ground support equipment, and their interfaces.
SCCDRL529	3.73.0-4	The SDP/MSPSP shall include measures to control and/or minimize each significant identified hazard.
SCCDRL530	3.73.0-5	In addition to identifying hazards, the SDP/MSPSP shall also identify applicable hazard controls, and verifications methods for each hazard, and document them in Hazard Reports.
SCCDRL531	3.73.0-6	The SDP/MSPSP hazard analysis shall be updated as the hardware progresses through the stages of design, fabrication, and test.
SCCDRL532	3.73.0-7	A list of all hazardous/toxic materials and associated material safety data sheets shall be included in the final SDP/MSPSP, as well as a description of the hazardous and safety critical operations associated with the satellite.
SCCDRL533	3.73.0-8	The spacecraft Project Manager shall demonstrate compliance with these requirements.
SCCDRL534	3.73.0-9	The spacecraft Project Manager shall certify to GSFC and the launch range, through the SDP, that all safety requirements have been met.
SCCDRL535	3.73.0-10	<p>The SDP/MSPSP shall include the following information:</p> <ul style="list-style-type: none"> a) Introduction. State, in narrative form, the purpose of the safety data package. b) System Description. This section may be developed by referencing other program documentation such as technical manuals, System Program Plan, System Specification. As applicable, either photos, charts, flow/functional diagrams, sketches, or schematics to

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SCCDRL535	3.73.0-10	<p>support the system description, test, or operation.</p> <ul style="list-style-type: none">c) System Operations.<ul style="list-style-type: none">1) A description or reference of the procedures for operating, testing and maintaining the system. Discuss the safety design features and controls incorporated into the system as they relate to the operating procedures.2) A description of any special safety procedures needed to assure safe operations, test and maintenance, including emergency procedures.3) A description of anticipated operating environments and any specific skills required for safe operation, test, maintenance, transportation or disposal.4) A description of any special facility requirements or personal equipment to support the system.d) Systems Safety Engineering Assessment.<ul style="list-style-type: none">1) A summary or reference of the safety criteria and methodology used to classify and rank hazardous conditions.2) A description of or reference to the analyses and tests performed to identify hazardous conditions inherent in the system.3) Hazard Reports for all hazards by subsystem or major component level that have been identified and considered from the inception of the program.<ul style="list-style-type: none">i.) A discussion of the hazards and the actions that have been taken to eliminate or control these items.ii.) A discussion of the effects of these controls on the probability of occurrence and severity level of the potential mishaps.iii.) A discussion of the residual risks that remain after the controls are applied or for which no controls could be applied.iv.) A discussion of or reference to the results of tests conducted to validate safety criteria requirements and analyses, which are also tracked and closed-out via the Verification Tracking Log (VTL).4) Results of Operating and Support Hazard Analysis performed to evaluate procedurally controlled activities for hazards or risk introduced into the system during pre-launch processing (i.e. launch site or processing facilities) and adequacy of procedures used to eliminate, control, or abate identified hazards or risks.5) Results of Software Safety Analysis performed to evaluate hazards caused by software. Section 5 of the MAR describes desired software safety activities to meet NASA HQ guidelines.e) Conclusions and Recommendations.<ul style="list-style-type: none">1) A short assessment of the results of the safety program efforts. A list of all significant hazards along with specific safety recommendations or precautions required ensuring the safety of personnel and property.2) For all hazardous materials generated by or used in the system:<ul style="list-style-type: none">i.) Material identification as to type, quantity, and potential hazards.ii.) Safety precautions and procedures necessary during use, storage, transportation, and disposal.iii.) A copy of the Material Safety Data Sheet (OSHA Form 20 or DD Form 1813) as required.3) Appropriate radiation forms/analysis.

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SCCDRL535	3.73.0-10	4) Reference material to include a list of all pertinent references such as Test Reports, Preliminary Operating Manuals and Maintenance Manuals 5) A statement signed by the Contractor System Safety Manager and the Program Manager certifying that all identified hazards have been eliminated or controlled and that the system is ready to test, operate, or proceed to the next acquisition phase. In addition, include recommendations applicable to the safe interface of this system with the other system(s).
SCCDRL536	3.74	3.74 Safety Non-Compliance / Waiver Requests
SCCDRL537	3.74.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> MA-11 2. <u>Title:</u> SAFETY NON-COMPLIANCE / WAIVER REQUESTS 3. <u>Use:</u> Documents variances of safety requirements that can not be met; explains the rationale for approval of each variance, as defined in NPR 8715.3. The Safety Non-Compliance / Waiver Requests may require Range Safety concurrence for the variance to be approved. 4. <u>Preparation Information:</u>
SCCDRL538	3.74.0-2	A Safety Non-Compliance / Waiver Request shall include the following information: a) A statement of the specific safety requirement and its associated source document name and paragraph number, as applicable, for which a waiver or deviation is being requested. b) A detailed technical justification for the exception. c) Analyses to show the mishap potential of the proposed alternate requirement, method or process, as compared to the specified requirement. d) A narrative assessment of the risk involved in accepting the waiver or deviation. When it is determined that there are no hazards, the basis for such determination should be provided. e) A narrative on possible ways of reducing hazards severity and probability and existing compliance activities (if any). f) Starting and expiration date for waiver/deviation.
SCCDRL539	3.74.0-3	A Safety Non-Compliance / Waiver Request shall be updated with the results of a decision on granting the request.
SCCDRL540	3.75	3.75 Pre-Mishap Plan
SCCDRL541	3.75.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> MA-12 2. <u>Title:</u> PRE-MISHAP PLAN 3. <u>Use:</u> To understand the Contractor's role, responsibility, and procedures to be implemented in the event of a mishap. 4. <u>Preparation Information:</u>

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SCCDRL542	3.75.0-2	<p>The Pre-Mishap Plan shall address the following at a minimum:</p> <ul style="list-style-type: none"> a) Procedures for the appointment of an Incident Commander and a Contractor Interim Response Team (CIRT) for mishaps and close calls. b) Procedures for safing, handling, or containing hazardous chemicals in the hardware. c) Procedures for emergency response personnel (e.g., identification and handling of hazardous commodities). d) How a mishap site will be secured. e) How debris will be collected, transported, and stored. f) Procedures to impound data, records, equipment, facilities, and property at the contractor's facility. g) Identify the local organizations and agencies, which are most likely to take part in emergency response; identify the roles and responsibilities of each organization; and identify a point of contact. h) Identify existing memoranda of agreement (if applicable) with national, state, and local organizations agencies that may be utilized during a mishap investigation i) Procedures for reporting a mishap or close calls within the Contractor's organization as well as to GSFC.
SCCDRL543	3.76	3.76 Safety Requirements Compliance Checklist
SCCDRL544	3.76.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-13 2. <u>Title:</u> SAFETY REQUIREMENTS COMPLIANCE CHECKLIST 3. <u>Use:</u> To demonstrate if the proposed design is compliant, non-compliant but meets intent, non-compliant (waiver required) or non-applicable. 4. <u>Preparation Information:</u>
SCCDRL545	3.76.0-2	<p>A Safety Requirements Compliance Checklist of all design, test, analysis, and data submittal requirements shall be provided for each requirement of the AFSPCMAN 91-710, Range Safety User Requirements.</p>
SCCDRL546	3.76.0-3	<p>The following items shall be included in the Safety Requirements Compliance Checklist:</p> <ul style="list-style-type: none"> a) Criteria/requirement. b) System. c) Compliance. d) Noncompliance. e) Not applicable. f) Resolution. g) Reference. h) Copies of all Range Safety approved non-compliances including waivers and equivalent levels of safety
SCCDRL547	3.77	3.77 Preliminary Hazard Analysis

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SCCDRL548	3.77.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-14 2. <u>Title:</u> PRELIMINARY HAZARD ANALYSIS 3. <u>Use:</u> The Preliminary Hazard Analysis (PHA) is used to obtain an initial risk assessment and identify safety critical areas of a concept or system. Based on the best available data, including mishap data from similar systems and other lessons learned. <p style="margin-left: 40px;">The PHA identifies safety provisions and alternatives needed to eliminate hazards or reduce their associated risk to a level acceptable to GSFC.</p> 4. <u>Preparation Information:</u>
SCCDRL549	3.77.0-2	The Preliminary Hazard Analysis shall include safety provisions and alternatives needed to eliminate hazards or reduce their associated risk to an acceptable level.
SCCDRL550	3.77.0-3	The PHA shall be based on the hazard assessment criteria provided in Chapter 3 of NPR 8715.3, to obtain an initial risk assessment of the system.
SCCDRL551	3.77.0-4	In the PHA, based on the best available data, including mishap data (if assessable) from similar systems and other lessons learned, hazards associated with the proposed design or function shall be evaluated for hazard severity, hazard probability, and operational constraint.
SCCDRL552	3.77.0-5	<p>The PHA shall consider the following for identification and evaluation of hazards at a minimum:</p> <ol style="list-style-type: none"> a) Hazardous components. b) Environmental constraints including the operating environments. c) Operating, test, maintenance, built-in-tests, diagnostics, and emergency procedures. d) Facilities, real property installed equipment, support equipment. e) Safety related equipment, safeguards, and possible alternate approaches. f) Safety related interface considerations among various elements of the system. This includes consideration of the potential contribution by software to subsystem/system mishaps. Identify safety design criteria to control safety-critical software commands and responses. Take action to incorporate them in the software (and related hardware) specifications. g) Malfunctions to the system, subsystems, or software. Specify each malfunction., Determine the causing and resulting sequence of events and the degree of hazard. Develop the appropriate specification and/or design changes. h) Include a system description and a description of the methodology used to develop the analysis.
SCCDRL553	3.78	3.78 Operations Hazard Analysis

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SCCDRL554	3.78.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-15 2. <u>Title:</u> OPERATIONS HAZARD ANALYSIS 3. <u>Use:</u> The Operations Hazard Analysis (OHA) addresses the implementation of safety requirements for personnel, all procedures, and equipment used during, testing, transportation, storage, and integration operations. 4. <u>Preparation Information:</u>
SCCDRL555	3.78.0-2	A Hazard Tracking Log shall be generated to track and close all remaining OHA open items.
SCCDRL557	3.78.0-3	Hazard Tracking Log (HTL) open items shall be transferred to a Verification Tracking Log
SCCDRL112 2	3.78.0-4	<p>The OHA shall include the following information:</p> <ol style="list-style-type: none"> a) Introduction <ol style="list-style-type: none"> 1) An abstract summarizing the major findings of the analysis and the proposed corrective or follow-up actions. 2) Any special terms, acronyms, and/or abbreviations used. b) System Description <ol style="list-style-type: none"> 1) A description of the system hardware and configuration. List components of subsystems. 2) The most recent schedules for integration and testing of the instrument/spacecraft. 3) Photographs, diagrams, and sketches included to support the test. c) Analysis of System Hazards <ol style="list-style-type: none"> 1) All real or potential hazards presented to personnel, equipment, and property during I&T processing. 2) A listing of all identified hazards in a tabulated format. Each hazard numbered that includes the following information: <ol style="list-style-type: none"> i.) System Component/Phase. The particular phase/component that the analysis is concerned with. This could be a system, subsystem, component, operating/maintenance procedure or environmental condition. ii.) System Description and Hazard Identification, Indication. <ol style="list-style-type: none"> (1) A description of what is normally expected to occur as the result of operating the component/subsystem or performing the operating/maintenance action. (2) A complete description of the actual or potential hazard resulting from normal actions or equipment failures. Indicate whether hazard will cause personnel injury and/or equipment damage. (3) A description of crew indications which include all means of identifying the hazard to operating or maintenance personnel. (4) A complete description of the safety hazards of software controlling hardware systems where the hardware effects are safety critical. iii.) Effect on System. The detrimental results an uncontrolled hazard could inflict on the whole system. iv.) Risk Assessment for each hazard

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SCCDRL112 2	3.78.0-4	<ul style="list-style-type: none"> v.) Caution and Warning Notes. A complete list of specific warnings, cautions, procedures required in operating and maintenance manuals, training courses, and test plans. vi.) Status/Remarks. <ul style="list-style-type: none"> (1) The status of actions to implement the recommended, or other, hazard controls. (2) Any information relating to the hazard, not covered in the other blocks, for example, applicable documents, previous failure data in similar systems, or administrative directions. d) References. List all pertinent references such as test reports, preliminary operating and maintenance manuals, and other hazard analysis. e) Appendices. The appendix will contain charts, graphs, or data which are too cumbersome for inclusion in the previous sections, or are applicable to more than one section. It may also contain detailed formulation or analysis which is more conveniently placed in an appendix.
SCCDRL558	3.79	3.79 GIDEP Alert / NASA Advisory Disposition
SCCDRL559	3.79.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-16 2. <u>Title:</u> GIDEP ALERT / NASA ADVISORY DISPOSITION 3. <u>Use:</u> To document the developer's disposition of GIDEP ALERTs; GIDEP SAFE-ALERTs; GIDEP Problem Advisories; GIDEP Agency Action Notices; NASA Advisories and component issues, hereinafter referred to collectively as "Alerts" with respect to parts and materials used in NASA product. The disposition documents that the Alerts either do not apply to NASA product or that the Alerts effect has been mitigated. 4. <u>Preparation Information:</u>
SCCDRL560	3.79.0-2	<p>GIDEP Alert / NASA Advisory Disposition shall include:</p> <ol style="list-style-type: none"> a) A list in accordance with the requirements of the appropriate DID of Section 11 of the Spacecraft Mission Assurance Requirements (SCMAR) with a notation for each line item as to whether there are applicable Alerts. b) The lists submitted per Section 11 of the SCMAR updated with Alert information as parts and materials are added. c) GSFC Form 4-37, "Problem Impact Statement Parts, Materials and Safety" or equivalent developer form, for Alerts provided by the GSFC Project Office.
SCCDRL561	3.79.0-3	<p>An equivalent developer form for GIDEP Alert / NASA Advisory Disposition shall include the following elements:</p> <ol style="list-style-type: none"> a) Impact Statement Preparer: Note: This item does not require completion if the message sender is the same as the impact evaluator. b) Project Name (s): <ol style="list-style-type: none"> 1) Has the project procured (or is planning to procure any parts, materials, or services) from the referenced manufacturer (s)? Place an X in appropriate area: Yes: No:

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SCCDRL561	3.79.0-3	2) If yes to 2A, does the project have the affected (or similar) part numbers? Place an X in appropriate area: Yes: No: 3) If Yes to 2B, list affected part numbers along with lot date codes. 4) If Yes to 2B, narratives are required for sections 3 and 4. c) Impact on Projects d) Action Taken
SCCDRL562	3.80	3.80 Failure Mode and Effects Analysis (FMEA) and Critical Items List (CIL) Report
SCCDRL563	3.80.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> MA-17 2. <u>Title:</u> FAILURE MODE AND EFFECTS ANALYSIS (FMEA) AND CRITICAL ITEMS LIST (CIL) REPORT 3. <u>Use:</u> The FMEA is a reliability analysis to evaluate design relative to requirements, identify single point failures, and identify hazards so as to guide preventive design actions. The CIL provides a list of critical items, which require the highest level of attention in design, fabrication, verification, and problem correction during the development, handling, and mission use of the system. 4. <u>Preparation Information:</u>
SCCDRL564	3.80.0-2	The FMEA and CIL report shall document the analysis including: a) Approach, methodologies, assumptions, results, conclusions, recommendations, and corrective actions; b) Objectives, level of the analysis, ground rules, functional description, functional block diagrams, reliability block diagrams, bounds of equipment analyzed, reference to data sources used, identification of problem areas, single-point failures, recommended corrective action, and worksheets as appropriate for the specific analysis being performed; c) Item identification, cross-reference to FMEA line items, and retention rationale for each item on the CIL. Appropriate retention rationale may include design features, historical performance, acceptance testing, manufacturing product assurance, elimination of undesirable failure modes, and failure detection methods
SCCDRL565	3.81	3.81 Limited Life Items List
SCCDRL566	3.81.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> MA-18 2. <u>Title:</u> LIMITED LIFE ITEMS LIST 3. <u>Use:</u> Defines and tracks the selection, use and wear of limited-life items and the impact on mission operations. 4. <u>Preparation Information:</u>
SCCDRL567	3.81.0-2	The Limited Life Items List shall list life-limited items and their impact on mission parameters.

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SCCDRL568	3.81.0-3	The Limited Life Items List shall define the expected life, required life, duty cycles, and rationale for selecting and using the items.
SCCDRL569	3.81.0-4	The Limited Life Items List shall include selected structures, thermal control surfaces, and electromechanical mechanisms. Atomic oxygen, solar radiation, shelf-life, extreme temperatures, thermal cycling, wear and fatigue are used to identify limited-life thermal control surfaces and structural items. When aging, wear, fatigue and lubricant degradation limit their life, include compressors, seals, bearings, valves, gyros, actuators and scan devices.
SCCDRL570	3.82	3.82 Request for Use of Multi-Mission or Previously Designed, Fabricated, or Flown Hardware
SCCDRL571	3.82.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-19 2. <u>Title:</u> REQUEST FOR USE OF MULTI-MISSION OR PREVIOUSLY DESIGNED, FABRICATED, OR FLOWN HARDWARE 3. <u>Use:</u> Description of contractor's approach and methodology for implementing Multi-Mission or Previously Designed, Fabricated, or Flown Hardware, including flow-down of applicable requirements to sub-developers. 4. <u>Preparation Information:</u>
SCCDRL572	3.82.0-2	The Request for Use of Multi-Mission or Previously Designed, Fabricated, or Flown Hardware shall demonstrate how the hardware complies with requirements.
SCCDRL573	3.82.0-3	<p>The Request for Use of Multi-Mission or Previously Designed, Fabricated, or Flown Hardware shall include as a minimum the following:</p> <ol style="list-style-type: none"> a) List of previous mission(s) used on. b) Levels to which this hardware was qualified. c) Parts list
SCCDRL574	3.83	3.83 Parts Stress Analysis Report
SCCDRL575	3.83.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-20 2. <u>Title:</u> PARTS STRESS ANALYSIS REPORT 3. <u>Use:</u> Provides EEE parts stress analyses for verifying circuit design conformance to derating requirements; demonstrates that environmental operational stresses on parts comply with project derating requirements. 4. <u>Preparation Information:</u>
SCCDRL576	3.83.0-2	<p>The Parts Stress Analyses Report shall contain:</p> <ol style="list-style-type: none"> a) Analyses ground rules b) Reference documents and data used c) Results and conclusions including impact on design and risk decisions d) Part identification (traceable to circuit diagrams)

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SCCDRL576	3.83.0-2	<ul style="list-style-type: none"> e) Assumed environmental conditions (consider all expected environments) f) Derating factors and parameters g) Rated stress and actual operating stress
SCCDRL577	3.84	3.84 Worst Case Analyses Report
SCCDRL578	3.84.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-21 2. <u>Title:</u> WORST CASE ANALYSES REPORT 3. <u>Use:</u> To demonstrate the adequacy of margin in the design of electronic and electrical circuits, optics, and electromechanical and mechanical items. 4. <u>Preparation Information:</u>
SCCDRL579	3.84.0-2	<p>The Worst Case Analyses Report shall:</p> <ul style="list-style-type: none"> a) Identify the part, subassembly, or assembly being analyzed b) Provide verification that the part, subassembly, or assembly performs properly for the mission life under all minimum and maximum parameter limits including the effects of environmental stresses c) Include all calculations relevant to the analysis d) Include any problems or potential problems with the part, subassembly, or assembly e) Include any recommendations to correct any problems or potential problems noted during the analysis
SCCDRL580	3.85	3.85 Reliability Program Plan
SCCDRL581	3.85.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-22 2. <u>Title:</u> RELIABILITY PROGRAM PLAN 3. <u>Use:</u> To provide planning, scheduling, and control for the reliability and Probabilistic Risk Assessment program. 4. <u>Preparation Information:</u>
SCCDRL582	3.85.0-2	<p>The Reliability Program Plan shall:</p> <ul style="list-style-type: none"> a) Identify the tasks the contractor will perform, and describe how the tasks will be scheduled relative to project milestones, implemented, and controlled b) Describe the activities that ensure reliability and PRA functions are an integral part of the design and development process c) Describe how reliability and PRA functions interact effectively with other project disciplines, including systems engineering, risk management, hardware design, software design, and product assurance practices to maximize the probability of meeting mission success criteria d) Describe how reliability analyses and PRA will incorporate definitions of failure, including alternate and degraded modes of operation in determining acceptable and

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SCCDRL582	3.85.0-2	<p>unacceptable levels of performance</p> <ul style="list-style-type: none"> e) Describe how the limited-life items will be identified and managed f) Describe how the contractor will interact with the Instrument and Ground System contractors to perform the “full scope” PRA for a Class A mission per NPR 8705.4 and NPR 8705.5
SCCDRL583	3.86	3.86 Reliability Block Diagrams and Predictions Report
SCCDRL584	3.86.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-23 2. <u>Title:</u> RELIABILITY BLOCK DIAGRAMS AND PREDICTIONS REPORT 3. <u>Use:</u> Provide a structured, disciplined approach to analyzing system risk to support management decisions to: ensure mission success; improve safety in design, operation, maintenance and upgrade; improve performance; and reduce design, operation and maintenance costs. 4. <u>Preparation Information:</u>
SCCDRL585	3.86.0-2	<p>The Reliability Block Diagrams and Predictions Report shall document the methodology and results of comparative reliability assessments including mathematical models, reliability block diagrams, failure rates, failure definitions, degraded operating modes, trade-offs, assumptions, and any other pertinent information used in the assessment process.</p>
SCCDRL586	3.87	3.87 Probabilistic Risk Assessment (PRA) Report
SCCDRL587	3.87.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> MA-24 2. <u>Title:</u> PROBABILISTIC RISK ASSESSMENT (PRA) REPORT 3. <u>Use:</u> Probabilistic Risk Assessment is a systematic and comprehensive methodology to evaluate risks associated with every life-cycle aspect of a complex engineered technological entity (e.g., spacecraft, instruments, and ground systems) from concept definition, through design, construction and operation, and up to removal from service. 4. <u>Preparation Information:</u>
SCCDRL588	3.87.0-2	<p>The PRA Report shall document the “full-scope” Probabilistic Risk Assessment for a Class A mission performed per NPR 8705.4 and NPR 8705.5 for the GOES-R mission with support from the Instrument and Ground System contractors, that includes:</p> <ul style="list-style-type: none"> a) The approach, methodology, results (e.g., the identification of high risk scenarios), conclusions, recommendations for corrective actions, and corrective actions taken b) Objectives, scope, level of analysis, ground rules, and assumptions c) Identification of all end states of specific decision-making interest, initiating events, and scenarios that could result in these end states d) Definition of the mission phases, operations concept, and success criteria e) Initiating and pivotal event models (e.g., Event Sequence Diagrams, Event Trees, Fault Tree Analysis, and phenomenological event models)

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SCCDRL588	3.87.0-2	<ul style="list-style-type: none"> f) Data development for probability calculations, including software failure likelihood estimates g) An integrated model and quantification to obtain risk scenarios and estimates h) An assessment of uncertainties
SCCDRL589	3.88	3.88 Trend Analysis Plan and Data Reports
SCCDRL590	3.88.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> MA-25 <li>2. <u>Title:</u> TREND ANALYSIS PLAN AND DATA REPORTS <li>3. <u>Use:</u> To monitor parameters on assemblies and subsystems throughout the normal test program that relate to performance stability (any deviations from the nominal that could indicate trends). NOAA operational personnel will continue monitoring trends through mission duration. <li>4. <u>Preparation Information:</u>
SCCDRL591	3.88.0-2	The Trend Analyses Plan shall document the process for selecting parameters related to performance stability, recording any changes from the nominal, analyzing trends, and coordinating results with design and operational personnel.
SCCDRL592	3.88.0-3	The Trend Analyses Plan shall list the identified key parameters that relate to performance stability.
SCCDRL593	3.88.0-4	Trend Analysis Data Reports shall document parameter trends starting at assembly acceptance testing and continuing through the entire integration and test phase; these parameters are to be monitored for trends leading towards loss of stability of operation.
SCCDRL594	3.88.0-5	Trend Analysis Data results shall be presented as part of the Pre-Environmental Review (PER) and Pre-Shipment Review (PSR).
SCCDRL595	3.88.0-6	<p>The Trend Analysis Data Reports shall contain a log that maintains the accumulated operating time and includes the following information, as a minimum:</p> <ol style="list-style-type: none"> <li>a) Identification of item <li>b) Serial number <li>c) Total operating time since assembly as a unit <li>d) Total operating time since last failure <li>e) Total additional operating time projected for the unit prior to launch <li>f) Expected operating ranges at the facility and in orbit <li>g) Identification of key parameters being monitored <li>h) Upper/lower specification tolerance limit for each parameter being monitored <li>i) Summary statement of any trending noted in earlier measurements of each parameter <li>j) Observed value (in sequence) for the reporting interval <li>k) Assessment of trends to date
SCCDRL596	3.89	3.89 Orbital Debris Assessment

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SCCDRL597	3.89.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <u>CDRL No:</u> MA-26 <u>Title:</u> ORBITAL DEBRIS ASSESSMENT <u>Use:</u> To ensure NASA requirements for post mission orbital debris control are met. <u>Preparation Information:</u>
SCCDRL598	3.89.0-2	The Orbital Debris Assessment shall be in accordance with NSS 1740.14, Guidelines and Assessment Procedures for Limiting Orbital Debris.
SCCDRL599	3.89.0-3	The PDR Orbital Debris Assessment shall identify areas where the program or project might contribute debris and to assess this contribution relative to the guidelines in so far as is feasible.
SCCDRL600	3.89.0-4	Prior to CDR a subsequent Orbital Debris Assessment shall comment on changes made since the PDR report.
SCCDRL601	3.89.0-5	The level of detail in the Orbital Debris Assessment shall be consistent with the available information of design and operations.
SCCDRL602	3.89.0-6	When there are design changes after CDR that impact the potential for debris generation, an update of the Orbital Debris Assessment shall be prepared, approved, and coordinated with the Office of System Safety and Mission Assurance.
SCCDRL603	3.89.0-7	Orbital Debris Assessment Software is available for download from Johnson Space Center at URL: http://sn-callisto.jsc.nasa.gov/mitigate/das/das.html
SCCDRL604	3.90	3.90 Verification Tracking Log
SCCDRL605	3.90.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <u>CDRL No:</u> MA-27 <u>Title:</u> VERIFICATION TRACKING LOG <u>Use:</u> Provides documentation of a Hazard Control and Verification Tracking process or “closed-loop system” that assures safety compliance has been satisfied in accordance to AFSPCMAN 91-710, Range Safety User Requirements. <u>Preparation Information:</u>
SCCDRL607	3.90.0-2	Open VTL items shall be closed with appropriate documented rationale prior to first operational use/restraint.
SCCDRL608	3.90.0-3	The Hazard Log (or VTL) shall provide documentation that demonstrates the process of verifying the control of all hazards by test, analysis, inspection, similarity to previously qualified hardware, or any combination of these activities.
SCCDRL609	3.90.0-4	All verifications in the VTL that are listed on the hazard reports shall reference the tests/analyses/inspections.
SCCDRL610	3.90.0-5	Results of VTL tests/analyses/inspections shall be available for review and submitted in accordance with the contract schedule and applicable launch site range safety requirements.
SCCDRL611	3.90.0-6	The VTL shall contain the following information in tabular format: <ol style="list-style-type: none"> Log

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SCCDRL611	3.90.0-6	<ul style="list-style-type: none"> b) Hazard Report # c) Safety Verification # d) Description (Identify procedures/analyses by number and title) e) Constraints on Launch Site Operations f) Independent Verification Required (i.e., mandatory inspection points)? Yes/No g) Scheduled Completion Date h) Completion Date i) Method of Closure
SCCDRL612	3.91	3.91 Satellite Photos and Videos
SCCDRL613	3.91.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ul style="list-style-type: none"> 1. <u>CDRL No:</u> SC-MNGT-01 2. <u>Title:</u> SATELLITE PHOTOS AND VIDEOS 3. <u>Use:</u> To provide a detailed historical record of the electrical and mechanical assembly details for each satellite. 4. <u>Preparation Information:</u>
SCCDRL614	3.91.0-2	Photographs shall be taken with a digital camera with a 10 to 12 megapixels to assist in failure investigations and anomaly resolution.
SCCDRL615	3.91.0-3	Photographs for press releases and public relations shall be taken with a minimum of 300 dpi resolution.
SCCDRL616	3.91.0-4	<p>Photographs shall be taken of:</p> <ul style="list-style-type: none"> a) Appendage assemblies, separation mechanisms and configured component installations, showing critical mechanical configurations including cable routing and supports; mechanical mechanisms; pre-and post-thermal blanket installation b) Subsystem integration and test, documenting the flight hardware, as integrated on the spacecraft c) The spacecraft, its subsystems and components throughout various stages of satellite integration and test, documenting the flight hardware, system test configurations, and satellite handling activities
SCCDRL617	3.91.0-5	Photographs shall include still photography--three 8x10 color prints of each of the following activities: before final encapsulation, cover-up, or final assembly, for the GOES-R satellite.
SCCDRL618	3.91.0-6	<p>At a minimum, the following events shall be photographed during closeout operations at the S/C contractor's facility, as applicable (pre-shipment), and at launch base:</p> <ul style="list-style-type: none"> a) Final closeout at the S/C contractor's facility prior to shipping: <ul style="list-style-type: none"> 1) Interior of each area of the satellite prior to final closure. 2) Exterior of the satellite

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SCCDRL618	3.91.0-6	<ol style="list-style-type: none"> 3) All deployable appendages, including but not limited to hinges, hold-downs, insulation blankets near deployables, and antennas. 4) Exterior of satellite installed in shipping container prior to lid closure, including but not limited to mounting points, purge lines, thermistors, and accelerometers. <p>b) At the launch base:</p> <ol style="list-style-type: none"> 1) Satellite fueling operations including but not limited to layout of the satellite, fueling GSE, and hoses. 2) Exterior of the satellite upon receipt at the Payload Processing Facility 3) Interior of the satellite prior to final closeout for launch 4) Final stowage condition of all deployables prior to encapsulation into the launch vehicle (LV) fairing. 5) Final condition of all antennas prior to LV encapsulation. 6) Removal sites of all red tag items prior to LV encapsulation (including but not limited to thruster covers, earth and sun sensors protective covers, and lifting eye bolts) 7) Exterior of the satellite prior to encapsulation 8) Prior to LV fairing door closure on the pad, photographs of the sites of at least any removed purged lines and electrical connections.
SCCDRL619	3.91.0-7	All photographs shall be annotated with information showing date, satellite, and unit identification.
SCCDRL620	3.91.0-8	Identical sets of photographs shall be taken for each satellite.
SCCDRL621	3.91.0-9	Videos shall be taken at the S/C contractor's facility of all moves of the satellite, major subsystems, and large components, all appendage deployments and dynamic environmental tests - with the exception of acoustic testing if CCTV is precluded due to facility constraints.
SCCDRL622	3.91.0-10	Videos shall be taken of all moves and lifts of the satellite at the Payload Processing Facility. This can be done in coordination with the Payload Processing Facility operator.
SCCDRL623	3.92	3.92 Satellite Operations Handbook (SOH)
SCCDRL624	3.92.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-MNGT-02 2. <u>Title:</u> SATELLITE OPERATIONS HANDBOOK (SOH) 3. <u>Use:</u> The Satellite Operations Handbook(s) provide comprehensive documentation on all aspects of satellite operations in a multi-volume set. 4. <u>Preparation Information:</u>
SCCDRL625	3.92.0-2	The Government will provide the GFP Instrument Operations Handbooks to aid in development of the SOH.
SCCDRL626	3.92.0-3	The SOH shall provide detailed information required for mission operations planning and development, satellite operation, analysis, and anomaly resolution in a comprehensive multi-volume set.

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SCCDRL1149	3.92.0-4	GFP instrument operations information shall be integrated into the SOH to provide a single, comprehensive reference for the entire satellite.
SCCDRL627	3.92.0-5	Electronic format of SOH volumes shall be hyperlinked to other SOH Volumes and other contractor supplied operations documents.
SCCDRL1150	3.92.0-6	The SOH shall be delivered in electronic format, in addition to 25 hardcopies and 25 electronic copies on portable media (CD or DVD).
SCCDRL628	3.92.0-7	<p>The section below defines the Content by Volume assignments. Individual data item descriptions have been prepared for each volume of the SOH:</p> <p>a) <u>Volume/Content Definitions:</u></p> <ol style="list-style-type: none"> 1) Volume 1 - Launch and Orbit Raising (LOR) Operations 2) Volume 2 - Contingency Operations 3) Volume 3 - Satellite Description (Including GFP Instruments and Mechanisms) 4) Volume 4 - On-Orbit Operations 5) Volume 5 - On-Board Computer User's Operations and Maintenance Manual 6) Volume 6 through Volume TBD - Satellite Specific Data
SCCDRL629	3.93	3.93 SOH Volume 1 : Launch and Orbit Raising (LOR) Operations
SCCDRL630	3.93.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-MNGT-02 2. <u>Title:</u> SOH VOLUME 1: LAUNCH AND ORBIT RAISING (LOR) OPERATIONS 3. <u>Use:</u> SOH Volume 1 provides a detailed description of the launch and early orbit phases of the GOES-R mission, including a description of mission profile, satellite activation and deployment operations. 4. <u>Preparation Information:</u>
SCCDRL631	3.93.0-2	Electronic format of SOH volumes shall be hyperlinked to other SOH Volumes and other contractor supplied operations documents.
SCCDRL632	3.93.0-3	<p>SOH Volume 1 shall provide detailed launch and early orbit operations and procedures including:</p> <ol style="list-style-type: none"> a) Pre-Launch Activities -How and when the satellite is configured at the launch facility. b) Launch and Orbital Considerations -Includes a description of the transfer orbit maneuver plan (if not direct injection), mission impacts of injection accuracy, solar and lunar operational impacts, sensor FOVs, power availability, sizing and performance capabilities of spacecraft engines, available telemetry during maneuvers, maneuver profiles, burn durations, fuel and mass margins, maneuver abort criteria, engine thermal characteristics and thruster alignment data. c) Satellite Launch Constraints -List of all conditions required for the launch to take place and a list of all conditions which would preclude launch. Provide detailed explanations of all GO/NOGO criteria. d) Launch Vehicle Characteristics -Overview of relevant information including available satellite telemetry during launch, launch profile, burn durations, fuel and mass margins, and final separation configuration. e) Ground Station Coverage -Predicted station availability (look angles, maximum

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SCCDRL632	3.93.0-3	<p>elevation, support duration, possible site conflicts) as function of launch date and time. Detailed description of all external element interfaces to the NOAA SOCC and Ground Network (GN) sites.</p> <p>f) T&C Requirements -All telemetry monitoring and command execution required between launch and checkout orbit injection</p> <p>g) Detailed Launch Timeline -Specific sequence of activities to be carried out from launch until orbital checkout station attainment, through handover. This should include the deployment of all appendages and satellite functional checkout activities.</p> <p>h) Launch Communications/Data Flow Requirements -All requirements for data or communications during launch including data rates, line availability, duration of service, back-up service configuration and failover cases.</p>
SCCDRL633	3.94	3.94 SOH Volume 2 : Contingency Operations
SCCDRL634	3.94.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <p>1. <u>CDRL No:</u> SC-MNGT-02</p> <p>2. <u>Title:</u> SOH VOLUME 2: CONTINGENCY OPERATIONS</p> <p>3. <u>Use:</u> SOH Volume 2 provides a detailed description of contingency prevention, detection, diagnosis and recommended response to deviations from expected launch, on-orbit storage and operational modes.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL635	3.94.0-2	Electronic format of SOH volumes shall be hyperlinked to other SOH Volumes and other contractor supplied operations documents.

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SCCDRL636	3.94.0-3	<p>The SOH Volume 2 shall include the following:</p> <ul style="list-style-type: none"> a) Contingency Operations Procedures - <ul style="list-style-type: none"> 1) Describe for each mission phase, in flow chart form, recommended satellite monitoring guidelines to assess the health and safety of all satellite components and subsystems, and to determine when any deviation from expected performance requires action. 2) Textual description of each failure mode and recommended operator response including, but not limited to, anomaly description, symptoms, possible causes, diagnostic actions, and required command sequences. 3) Graphical flow charts that provide logic paths that aid operations personnel in diagnosing spacecraft failures, provide immediate safing actions, and steps to recover normal operations. b) Descriptions in flow chart form and text, the immediate actions to be taken by the operations staff when deviations from expected performance occur. Include exact telemetry to be monitored, pre-requisite conditions to be met, and all procedures, plans, and commands to be sent to maintain the short-term health of the flight system and steps to recover normal operations. c) The flow charts will highlight operations including single points of failure which exist on the as-built spacecraft. Include any special configurations or interaction with the ground system required for a particular contingency. d) Redundant Devices, Components and Systems - For each redundant device, component, and system, describe how the unit is switched to its backup unit and all operational impacts of performing the switch to the backup side.
SCCDRL637	3.95	3.95 SOH Volume 3 : Spacecraft Description
SCCDRL638	3.95.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-MNGT-02 2. <u>Title:</u> SOH VOLUME 3: SPACECRAFT DESCRIPTION 3. <u>Use:</u> SOH Volume 3 provides supporting information for the development of spacecraft operations procedures and practices. Volume 3 includes detailed component-level descriptions of the operation of each subsystem, instrument, and payload, including operational constraints and all interactions with other subsystems and payloads. SOH Volume 3 is used extensively by the Flight Operations Team including controllers and engineers. The document should be comprehensive and detailed. 4. <u>Preparation Information:</u>
SCCDRL639	3.95.0-2	Electronic format of SOH volumes shall be hyperlinked to other SOH Volumes and other contractor supplied operations documents.
SCCDRL640	3.95.0-3	<p>SOH Volume 3 shall include, as a minimum, the following information. Extensive usage of figures, tables, and block diagrams should be included for clarity:</p> <ul style="list-style-type: none"> a) Mission Overview -Detailed description of overall GOES System including the interface between the space and ground segment. Include individual descriptions of the space segment, ground segment, and operations aspect. Operations phases should include LOR, post-launch testing, normal on-orbit operations, on-orbit

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SCCDRL640	3.95.0-3	<p>storage, and spacecraft end-of-life disposal.</p> <p>b) Spacecraft Subsystem Description -A detailed description of each subsystem should be provided, including subsystem internal interface and operation, and interface and interactions with other subsystems. As a minimum, include the following information in the subsystem description:</p> <ol style="list-style-type: none"> 1) Subsystem Description - Include a general description and overview of the subsystem. Include block diagrams to depict internal and external subsystem interfaces and subsystem function. 2) Subsystem Thermal Environment -Identify component and unit level expected normal operating temperatures, survival temperatures, and any operationally related thermal constraints/restrictions. 3) Subsystem General Characteristics -Subsystem component and unit level assembly locations should be identified. Include component and unit level assembly weights, and physical dimensions. Subsystem power consumption by component/unit should be detailed. 4) Command and Telemetry Data Sets -Identify subsystem command and telemetry data sets, including selectable command options. This information can be provided as a subsystem specific hyperlink to the Spacecraft Command and Data Handbook. (TBR) 5) Subsystem Component Description -Provide detailed description of component (e.g. RF switches) and unit level assemblies, including unit level functional block diagrams. For units with modules containing multiple slices, slice partitioning should be itemized by service/function. Include detailed description of subsystem redundancy, and fault detection and correction capabilities. Identify known degraded performance operational mode capabilities. 6) Microprocessor Based Systems -Provide description of interrupt architecture, memory architecture and mapping, system initialization, hardware fault protection, I/O interfaces with other subsystems, and system level error/error code definitions. 7) Software -Hyperlink to the Software Maintenance Manual 8) Operational Modes -For subsystems with multiple operational modes provide a description of subsystem operational modes (e.g. mode vs. mission phase associations), mode drivers and constraints, and mode unique command and telemetry relationships/sequences. 9) Maintenance Requirements -Provide description, schedule, and procedure for implementing subsystem maintenance requirements. 10) Mechanisms -Provide detailed descriptions of all mechanisms. This should include figures depicting stowed and deployed configurations, location of the mechanism, mechanism dimensional information, and detailed drawings of each mechanism (Include cross-sectional drawings). Slip-ring to harness assignments should be provided for the Solar Array Drive mechanism. 11) RF Communications -RF Communications subsystem command and receiver information should include EIRP, frequency, antenna characteristics, data rates, data formats, subcarrier scheme, dynamic range, G/T, and ETE BER performance specifications. 12) Need to verify contract mechanism for GFP contractors to provide required information. (TBR)

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SCCDRL642	3.96.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-MNGT-02 2. <u>Title:</u> SOH VOLUME 4: ON-ORBIT OPERATIONS 3. <u>Use:</u> SOH Volume 4 provides detailed descriptions of nominal spacecraft operations and on-orbit storage operations for the GOES-R mission. 4. <u>Preparation Information:</u>
SCCDRL643	3.96.0-2	Electronic format of SOH volumes shall be hyperlinked to other SOH Volumes and other contractor supplied operations documents.
SCCDRL644	3.96.0-3	The SOH Volume 4 shall describe satellite on-orbit capabilities and operating modes.
SCCDRL645	3.96.0-4	<p>SOH Volume 4 shall include the following information:</p> <ol style="list-style-type: none"> a) Describe the performance capabilities of all subsystems when in the on-orbit configuration. Describe each possible operating mode, means of transition, and constraints on operation in each mode. b) Describe standard operating procedures for all prerequisite conditions, dependencies, constraints, proper sequence, and verification of any individual command or command set necessary to accomplish normal flight operations tasks. c) Describe special event operations (e.g. Storage Mode and special orbit maneuver execution) to a level of detail consistent with the normal operations procedures. d) Describe all routine maintenance events such as orbit adjustments, momentum management, and solar array adjustments. Address in detail all procedures necessary to accomplish these tasks. e) Performance Assessment (Monitoring Guidelines) -Provide detailed description of which performance parameters are to be trended and at what frequency. Describe expected trends and identify possible deviations from normal that may indicate degradation or impending failure of a component or subsystem, or that otherwise may affect satellite performance. f) Describe on-orbit storage mode operations -Include recommend pre-storage operations activities and storage mode acquisition, on-orbit storage operations, and operations required to remove the satellite from storage and return it to normal operational mode. This information includes: <ol style="list-style-type: none"> 1) Definition of all on-orbit storage configuration requirements (spacecraft and all communications and instrument payloads), 2) Operational constraints and monitoring requirements, 3) Recommended periodic retest plans over the five year storage period. g) Describe de-orbit and deactivation procedures for use at satellite EOL, including suggested EOL criteria, EOL consumable requirements, detailed satellite procedures to achieve a super-synchronous orbit, and recommended sequences to perform an orderly, controlled turn-off of all satellite subsystems and communications and instrument payloads.
SCCDRL646	3.97	<p>3.97 SOH Volume 5 : On-Board Computer (OBC) User's Operations and Maintenance Manual</p>

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SCCDRL647	3.97.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-MNGT-02 2. <u>Title:</u> SOH VOLUME 5: ON-BOARD COMPUTER (OBC) USER'S OPERATIONS AND MAINTENANCE MANUAL 3. <u>Use:</u> SOH Volume 5 provides a detailed user's Operations and Maintenance Manual for the GOES-R Flight OBC. 4. <u>Preparation Information:</u>
SCCDRL648	3.97.0-2	Electronic format of SOH volumes shall be hyperlinked to other SOH Volumes and other contractor supplied operations documents.
SCCDRL649	3.97.0-3	<p>SOH Volume 5 shall provide the following OBC information:</p> <ol style="list-style-type: none"> a) Overview of basic OBC performance specifications b) Functional block diagrams of interfaces with all other satellite subsystems. c) Detailed description of OBC operations, including initialization, redundancy switching and diagnostic capabilities. d) Detailed description of procedures for OBC operation, including table loads, memory read-out, builds, links, and routine flight software management. e) Include a Hyperlink to the Software Maintenance Manual. f) Complete memory layout including physical and logical. Detail description of how the data is stored in memory.
SCCDRL650	3.98	3.98 SOH Volume 6 through Volume TBD : Satellite Specific Data
SCCDRL651	3.98.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-MNGT-02 2. <u>Title:</u> SOH VOLUME 6 THROUGH VOLUME TBD: SATELLITE SPECIFIC DATA 3. <u>Use:</u> Provides satellite unique data for each satellite in the GOES-R Series. This data is used to modify ground system databases, monitoring guidelines and performance expectations due to satellite-specific characteristics within the same series. 4. <u>Preparation Information:</u>
SCCDRL652	3.98.0-2	Electronic format of SOH volumes shall be hyperlinked to other SOH Volumes and other contractor supplied operations documents.
SCCDRL653	3.98.0-3	SOH Volume 6 through Volume TBD shall be updated as required throughout the mission.
SCCDRL654	3.98.0-4	<p>SOH Volume 6 through Volume TBD shall include:</p> <ol style="list-style-type: none"> a) Calibration Curves -Calibration data used by the ground system to convert satellite telemetry into accurate engineering values. Includes both analog and digital telemetry from the spacecraft bus and instrument engineering telemetry derived from the wideband (raw data) stream. b) Telemetry Limits -Three type of limits are provided. Red Limits, Yellow Limits, and

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SCCDRL654	3.98.0-4	<p>Design/Operations Limits. Red limits are the values above or below which the operator or satellite must take action to prevent possible damage of the component. Yellow limits are defined to indicate a precursor to Red Limits. Design/Operations limits are the values which the component maintains throughout the nominal mission.</p> <ul style="list-style-type: none"> c) Mass Properties -Sequenced list of center of mass, moments and products of inertia for nominal mission configurations and phase, including before and after each deployment, ascent maneuver, on station, and end of life conditions. d) Power -Measured power for each unit, power budget summary including load uncertainty, predicted solar array output over the mission life, and predicted battery charge performance over the mission life. e) Communications Link Margins -Bandpass response, output power and frequency for all transmitters, frequency ratios for all transponders, and sensitivity thresholds for all receivers. Include antenna patterns. f) Sensor/Actuator Alignment Data -Forces and torques which correspond to the motion of the satellite center of mass. Impingement of thrusters on satellite components. Solar induced torque predictions. Alignment data of all sensors and actuators. g) Deployable Torque Margins/Signatures -Available torque, required torque, remaining torque, and expected deployment signatures for all deployables. h) Thruster Force and Torque Tables for all satellite configurations i) Propulsion - Thruster performance, including thrust, specific impulse, mixture ratios flow rates, and efficiencies. Thermal ramifications of long duration burns. Include any special parameters of electric thrusters.
SCCDRL655	3.99	3.99 Fields-of-View (FOV) Analysis Report
SCCDRL656	3.99.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-MECH-01 2. <u>Title:</u> FIELDS-OF-VIEW (FOV) ANALYSIS REPORT 3. <u>Use:</u> FOV Analysis Report used to support the optimization of the overall spacecraft configuration and to assure compliance with the FOV requirements of all spacecraft sensors and GFP instruments. 4. <u>Preparation Information:</u>
SCCDRL657	3.99.0-2	The FOV Analysis Report shall document a complete fields-of-view (FOV) analysis of each instrument and sensor.
SCCDRL658	3.99.0-3	<p>The FOV Analysis Report shall include:</p> <ul style="list-style-type: none"> a) Derivation of the optimized configuration, location, and compatibility for each instrument, spacecraft sensor, solar array, exhaust plume. b) The functional requirements compared to the design. c) FOV tolerances and errors. d) Detailed quantitative descriptions of all objects within the fields-of-view. e) Analysis of blockage disturbances and reflections including sun glint.
SCCDRL659	3.99.0-4	The FOV Analysis Report shall include trade-offs conducted for the optimization of the spacecraft configuration.

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SCCDRL660	3.99.0-5	The FOV Analysis Report revisions shall reflect test, measurement, and configuration changes.
SCCDRL661	3.100	3.100 Solid Model
SCCDRL662	3.100.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> SC-MECH-02 2. <u>Title:</u> SOLID MODEL 3. <u>Use:</u> Government will use a Solid Model for independent verification of constraints and field of view requirements. 4. <u>Preparation Information:</u>
SCCDRL663	3.100.0-2	Solid Model shall be delivered in its native, STEP, and lightweight formats.
SCCDRL664	3.100.0-3	Solid Model shall include both stowed and deployed configurations.
SCCDRL665	3.100.0-4	Solid Model shall be validated for geometric accuracy and integrity.
SCCDRL666	3.100.0-5	The lightweight format for the Solid Model shall be eDrawings by Solid Works Corp., Lattice 3D XVL by Lattice Technology, or similar product approved by the Government.
SCCDRL116 1	3.100.0-6	Two additional Solid Models shall be delivered in a format compatible with Satellite Tool Kit (STK) by AGI, for long term operations use.
SCCDRL116 2	3.100.0-7	One STK-compatible Solid Model deliverable shall be a detailed, complete model. This will be for government use and not for public use.
SCCDRL116 3	3.100.0-8	The second STK-compatible Solid Model deliverable shall be suitable for public use.
SCCDRL667	3.101	3.101 Critical Mechanical Clearance List and Model
SCCDRL668	3.101.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> SC-MECH-03 2. <u>Title:</u> CRITICAL MECHANICAL CLEARANCE LIST AND MODEL 3. <u>Use:</u> This document is used to identify and track critical clearances in the satellite design including satellite to launch vehicle fairing and deployable paths. 4. <u>Preparation Information:</u>
SCCDRL669	3.101.0-2	The Critical Mechanical Clearance List and Model shall include minimum clearances, under normal and worst case conditions, between any moving mechanical assembly or deployable, and any other hardware, including structure, components, thermal control materials, cabling, and harness.
SCCDRL670	3.101.0-3	The analysis results used in the Critical Mechanical Clearance List and Model shall include the effects of environments on the structure including gravity release and thermal distortions.
SCCDRL671	3.101.0-4	The Critical Mechanical Clearance List and Model shall address the mitigations taken to prevent mechanisms from hanging.
SCCDRL672	3.102	3.102 Alignment Plan

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SCCDRL673	3.102.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <u>CDRL No:</u> SC-MECH-04 <u>Title:</u> ALIGNMENT PLAN <u>Use:</u> The Alignment Plan establishes alignment budgets for satellite components and integration of GFP instruments with the spacecraft bus, and an implementation plan at all levels of assembly and test. <u>Preparation Information:</u>
SCCDRL674	3.102.0-2	The Alignment Plan shall be a satellite-level document that describes the budgets assigned for structure including secondary structure, GN&C sensor module, and instruments.
SCCDRL675	3.102.0-3	The Alignment Plan shall list all alignments and the tolerances for spacecraft components and GFP instrument interfaces.
SCCDRL676	3.102.0-4	The Alignment Plan shall list all tooling and alignment methods required to meet critical and non-critical alignments.
SCCDRL677	3.102.0-5	The Alignment Plan shall specify sign convention for positive and negative angles.
SCCDRL678	3.102.0-6	The Alignment Plan shall describe a fail-safe method to avoid sign errors.
SCCDRL115 1	3.102.0-7	The Alignment Plan shall provide satellite alignment procedures.
SCCDRL679	3.103	3.103 Alignment Report
SCCDRL680	3.103.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <u>CDRL No:</u> SC-MECH-05 <u>Title:</u> ALIGNMENT REPORT <u>Use:</u> For establishing compliance with alignment requirements. The actual alignment values after mechanical integration of various components are listed here. The actual alignment values will then be used by the government engineering team to assess satellite performance and to list in the Satellite Operations Handbook. <u>Preparation Information:</u>
SCCDRL681	3.103.0-2	The Alignment Report shall list all achieved alignment values and the corresponding specifications for all spacecraft components and GFP instrument interfaces.
SCCDRL682	3.103.0-3	The Alignment Report shall state the sign convention for positive and negative angles.
SCCDRL115 2	3.103.0-4	The Alignment Plan shall provide as-run satellite alignment procedures documenting the analysis and data used to determine the final alignment
SCCDRL683	3.104	3.104 Stress Analysis Reports
SCCDRL684	3.104.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <u>CDRL No:</u> SC-MECH-06 <u>Title:</u> STRESS ANALYSIS REPORTS

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL684	3.104.0-1	<p>3. <u>Use:</u> To document the margins of safety calculations for all structural elements in the spacecraft.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL685	3.104.0-2	The Stress Analysis Reports shall include detailed stress analyses and margin of safety calculations for all components of the spacecraft.
SCCDRL686	3.104.0-3	The stress information in the Stress Analysis Reports shall be summarized in tabular form, providing a description of each structural element, its critical loading conditions, including thermal and mechanisms loading, failure modes, margins of safety, and reference to detailed analyses.
SCCDRL687	3.104.0-4	The Stress Analysis Reports shall identify primary load-paths and all simplifying assumptions.
SCCDRL688	3.104.0-5	The final Stress Analysis Reports shall document and include any additional finite elements models developed for use in analyzing structural components.
SCCDRL689	3.104.0-6	The Stress Analysis Reports shall describe any parametric studies undertaken to minimize component loads.
SCCDRL690	3.104.0-7	The Stress Analysis Reports shall describe the structural requirements including flight loads, mode shapes frequencies, mass properties, stresses, deformations and information defining the structural materials such as alloy type, strength, heat treatment, hardness, chemical treatment, finish and other physical properties that have an influence on structural analysis.
SCCDRL691	3.104.0-8	The Stress Analysis Reports shall present the structural requirements of the launch vehicle that are related to the spacecraft.
SCCDRL692	3.104.0-9	The final version of the Stress Analysis Reports shall incorporate the results of the test verified flight loads analysis, where such changes are necessary because of loads that exceeded previously predicted levels.
SCCDRL693	3.105	3.105 Structural and Mechanical Subsystem Performance Analysis Report
SCCDRL694	3.105.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <p>1. <u>CDRL No:</u> SC-MECH-07</p> <p>2. <u>Title:</u> STRUCTURAL AND MECHANICAL SUBSYSTEM PERFORMANCE ANALYSIS REPORT</p> <p>3. <u>Use:</u> To document the analyses and data demonstrating that all structural and mechanical subsystem performance requirements are satisfied.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL695	3.105.0-2	The Structural and Mechanical Subsystem Performance Analysis Report shall apply to each spacecraft configuration.
SCCDRL696	3.105.0-3	The Structural and Mechanical Subsystem Performance Analysis Report shall define the spacecraft design limit loads.
SCCDRL697	3.105.0-4	The Structural and Mechanical Subsystem Performance Analysis Report shall describe the philosophy used in the derivation of the design limit loads.

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL698	3.105.0-5	The Structural and Mechanical Subsystem Performance Analysis Report shall document the factors of safety and uncertainty factors applied to or utilized in the development of the design limit loads.
SCCDRL699	3.105.0-6	The Structural and Mechanical Subsystem Performance Analysis Report shall document the spacecraft and GFP instrument flight loads analysis data and results, for each flight loads analysis performed either by the spacecraft contractor or by the launch vehicle contractor.
SCCDRL700	3.105.0-7	The Structural and Mechanical Subsystem Performance Analysis Report shall identify primary load paths and state all assumptions used for flight loads analyses.
SCCDRL701	3.105.0-8	The Structural and Mechanical Subsystem Performance Analysis Report shall document the analyses, tests, and test data required to verify all spacecraft alignment and stiffness requirements.
SCCDRL702	3.105.0-9	The Structural and Mechanical Subsystem Performance Analysis Report shall address spacecraft mechanical design verification with respect to dynamic interactions with the launch vehicle and GFP instruments.
SCCDRL703	3.105.0-10	The Structural and Mechanical Subsystem Performance Analysis Report shall document all spacecraft critical clearances and loss of clearances, with the associated analyses.
SCCDRL704	3.105.0-11	The Structural and Mechanical Subsystem Performance Analysis Report shall include dynamic loss of clearance between the spacecraft including GFP instruments and the launch vehicle, and between various spacecraft elements.
SCCDRL705	3.105.0-12	The Structural and Mechanical Subsystem Performance Analysis Report shall document the predicted clearance loss for critical clearances throughout all mission phases, including launch, on-orbit deployments and on-orbit operations.
SCCDRL706	3.105.0-13	The Structural and Mechanical Subsystem Performance Analysis Report shall document the components contributing to each clearance loss including manufacturing and assembly tolerances, spacecraft dynamics and thermal gradients, spacecraft insulation, harnesses and grounding provisions.
SCCDRL707	3.105.0-14	The Structural and Mechanical Subsystem Performance Analysis Report shall document the analytical and measured data used for clearance verification.
SCCDRL708	3.105.0-15	The Structural and Mechanical Subsystem Performance Analysis Report shall document the tests and analyses performed to verify the performance of the spacecraft mechanisms and deployment devices.
SCCDRL709	3.105.0-16	The Structural and Mechanical Subsystem Performance Analysis Report shall document the analyses and test data used to verify the spacecraft structural performance and workmanship.
SCCDRL710	3.105.0-17	The Structural and Mechanical Subsystem Performance Analysis Report shall address any methods utilized during fabrication and assembly which verify workmanship of the spacecraft structure and mechanical components.
SCCDRL711	3.105.0-18	The Structural and Mechanical Subsystem Performance Analysis Report shall document force and/or torque margin analysis and test data for all spacecraft deployables and mechanisms.
SCCDRL712	3.105.0-19	The Structural and Mechanical Subsystem Performance Analysis Report shall provide INR performance analysis data from on-orbit thermal distortion analysis.
SCCDRL713	3.105.0-20	The Mechanisms Performance Analysis Report shall : <ul style="list-style-type: none"> a) Consist of block diagrams, analyses, and computer simulations of all electromechanical and deployable mechanisms and control systems to demonstrate compliance with the design and performance requirements.

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SCCDRL713	3.105.0-20	<ul style="list-style-type: none"> b) Consist of a mechanisms requirements compliance matrix identifying the demonstration method for each requirement. c) Document analytical and measured gain and phase margins. d) Document predicted and measured dynamic disturbances generated by all moving components. e) Describe the sensors and the sensor telemetry available for diagnosing and assessing the dynamic behavior of the spacecraft on-orbit. f) Contain results from timing margin analysis of the asynchronous circuitry used in control systems. g) Contain results from worst case and end of life performance analyses. h) Contain life test plans for components with bearings, flexible mounts, or flexible harnessing.
SCCDRL714	3.105.0-21	All supporting analysis, simulations, and/or databases for the Mechanisms Performance Analysis Report shall be available for review at the contractor's facilities.
SCCDRL112 5	3.105.0-22	<p>For the submittal at the subsystem PDR, the Structural and Mechanical Subsystem Performance Analysis Report shall include:</p> <ul style="list-style-type: none"> a) Dynamic load requirement flow chart. b) Summary of the models/analyses used to determine the mechanical behavior of the structure. c) Spacecraft stiffness requirements. d) Summary of the validation test performed or planned to correlate the model. e) Design loads tables. f) Alignment budget (preliminary). g) Dynamic loss of clearance. h) Comparison of requirements against analysis results. i) Description of in-process testing requirements (proofload of bonded joints).
SCCDRL715	3.106	3.106 Structural Math Models and Report
SCCDRL716	3.106.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-MECH-08 2. <u>Title:</u> STRUCTURAL MATH MODELS AND REPORT 3. <u>Use:</u> The government will use the models to predict structural accelerations, deflections, internal loads and on-orbit dynamic analysis. The launch vehicle contractor will use the reduced order structural math model in a coupled loads analysis to predict the spacecraft flight loads. 4. <u>Preparation Information:</u>
SCCDRL717	3.106.0-2	The Structural Math Models and Report shall represent the spacecraft in its launch and operational configurations including all the integrated science instruments.

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SCCDRL718	3.106.0-3	The Structural Math Models and Report shall include full and reduced order models for each configuration.
SCCDRL719	3.106.0-4	The launch configured reduced order model in the Structural Math Models and Report shall be a Craig-Bampton reduction transformation of the full order model including modes to 100 Hz.
SCCDRL720	3.106.0-5	The on orbit configured model in the Structural Math Models and Report shall be a modal transformation of the full order model including modes to 500 Hz.
SCCDRL721	3.106.0-6	The on orbit model in the Structural Math Models and Report shall include time histories of the operational forces and torques including the reaction wheels, thrusters and solar array stepping.
SCCDRL722	3.106.0-7	The full order models in the Structural Math Models and Report shall be MSC/NASTRAN compatible.
SCCDRL723	3.106.0-8	The models in the Structural Math Models and Report shall be in SI units.
SCCDRL724	3.106.0-9	The final models in the Structural Math Models and Report shall be correlated to modal survey data.
SCCDRL725	3.106.0-10	The reduced order models in the Structural Math Models and Report shall include load transformation matrices (LTMs).
SCCDRL726	3.106.0-11	The LTMs in the Structural Math Models and Report shall : <ol style="list-style-type: none">Consist of influence coefficients relating selected output variables to the associated dynamics model response variable,Include launch vehicle to spacecraft interface reaction forces, component to spacecraft interface reaction forces, and reaction forces at support locations for deployables,Include spacecraft net acceleration loads at the spacecraft center of mass,Include force, shear, and moment coefficients for determining internal loads in critical structural members,Include coefficients for determining absolute and relative deflections of spacecraft internal elements,Include instrument net acceleration loads at the instrument center of mass,Include discrete instrument interface accelerations and forces, andInclude boundary acceleration effects.

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SCCDRL112 6	3.106.0-12	<p>The Structural Math Models and Report shall document the math models with the following information:</p> <ol style="list-style-type: none"> a) Configuration version b) Identification of the documents and drawings used to generate the model c) Model mass properties d) Boundary conditions e) Figures showing the components modeled f) References used for the mechanical properties g) Summary of output results including modal frequencies, deflections and critical stresses h) Un-deformed and deformed plots of the FEM i) Any parametric studies undertaken to minimize component loads j) Output and input rows and columns of the LTMs
SCCDRL727	3.107	3.107 Mass Properties Report
SCCDRL728	3.107.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: SC-MECH-09 2. <u>Title</u>: MASS PROPERTIES REPORT 3. <u>Use</u>: To document all physical mass properties of the spacecraft, its subsystems and components from preliminary design through final assembly, launch and throughout all phases of the mission up to End of Life (EOL). 4. <u>Preparation Information</u>:
SCCDRL729	3.107.0-2	<p>The coordinate system used in this Mass Properties Report shall be in accordance with the Society of Allied Weight Engineers (SAWE) Recommended Practice No. 6. ["Standard Coordinate Systems for Reporting the Mass Properties of Flight Vehicles; Recommended Practice No. 6", Revised 1 September 1999, Society of Allied Weight Engineers, Los Angeles, 3 January 1995.]</p>
SCCDRL730	3.107.0-3	<p>The Mass Properties Report shall be in accordance with the requirements of the Society of Allied Weight Engineers (SAWE) Recommended Practice (RP) No. 11 sections 5.3.3 and 5.3.4. ["Mass Properties Control for Space Vehicles; Recommended Practice No. 11", Rev. B, Society of Allied Weight Engineers, Los Angeles, 3 June 2000.]</p>
SCCDRL731	3.107.0-4	<p>The Mass Properties Report shall provide a mass properties database for each spacecraft including the GFP instruments.</p>
SCCDRL732	3.107.0-5	<p>The Mass Properties Report shall include mass, center of gravity, moments of inertia, and products of inertia.</p>
SCCDRL733	3.107.0-6	<p>The Mass Properties Report shall be based upon calculated values.</p>
SCCDRL734	3.107.0-7	<p>The Mass Properties Report shall be updated as calculations are revised and actual measured data becomes available.</p>
SCCDRL735	3.107.0-8	<p>Following environmental testing and prior to the satellite shipment, the Mass Properties Report shall contain a complete mass properties summary of the final satellite mass properties as measured.</p>

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SCCDRL736	3.107.0-9	The Mass Properties Report shall include the appropriate mass contingency for the current stage of hardware development, along with the allocated mass allowable.
SCCDRL737	3.107.0-10	<p>The Mass Properties Report shall include the following:</p> <ol style="list-style-type: none"> a) An overall satellite mass summary, including total spacecraft dry mass, spacecraft subsystem dry mass, total satellite launch mass (including propellant), total satellite orbit insertion mass, and satellite mass at EOL b) A spacecraft mass properties summary for the various phases of the mission, including launch, deployments, separation, through EOL. Demonstrate mass changes due to propellant utilization throughout the mission through EOL c) A detailed mass properties summary of all satellite hardware organized by subsystem d) A summary of all mass properties changes incorporated into the satellite mass properties database since the last report.
SCCDRL738	3.108	3.108 Reduced Integrated Satellite Thermal Model and Report
SCCDRL739	3.108.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-THER-01 2. <u>Title:</u> REDUCED INTEGRATED SATELLITE THERMAL MODEL AND REPORT 3. <u>Use:</u> The reduced spacecraft thermal model and the reduced instrument models will be combined into a Reduced Integrated Satellite Thermal Model (RISTM) to represent GOES-R.. <p>The RISTM will be delivered to the government and then transferred to each of the instrument vendors for their use.</p> <p>Instrument contractors will employ the RISTM to independently verify the thermal interface between the spacecraft and the instruments.</p> <p>The RISTM in launch configuration will be delivered to the launch vehicle provider via the government for assessing Spacecraft, Instrument and Launch Vehicle safety concerns.</p> <p>After delivery to the government, the RISTM is expected to be exercised by various parties throughout the GOES-R mission life.</p> <p>The RISTM report facilitates the transfer, use and suggestions of potential modifications of the RISTM by the Government and/or participating Government contractors.</p> 4. <u>Preparation Information:</u>
SCCDRL740	3.108.0-2	The official Reduced Integrated Satellite Thermal Model shall be maintained by the spacecraft contractor.
SCCDRL741	3.108.0-3	The reduced instrument thermal models (furnished by the government) shall be incorporated / integrated with the reduced spacecraft thermal model to form the RISTM.
SCCDRL742	3.108.0-4	The RISTM report shall demonstrate the credibility of the model by reviewing the details of the model correlation activities by including:

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SCCDRL742	3.108.0-4	<ul style="list-style-type: none"> a) Sample run results based on stacked variables, as noted in this document, (including worst EOL hot case and worst BOL cold case), which reproduce proper temperatures and heater power results. b) A tabular listing of min/max temperature predictions vs. allowable operating and non-operating MAT limits for all model nodes c) A tabular listing of heater power prediction vs allowable heater power limits for all model nodes
SCCDRL743	3.108.0-5	The RISTM shall be correlated by the second deliverable submission against the Detailed Integrated Satellite Thermal Model (DISTM).
SCCDRL744	3.108.0-6	The correlation of RISTM to DISTM shall include at least the following cases: a hot operating EOL case, a cold operating BOL case, a transient eclipse case, and a cold storage case.
SCCDRL745	3.108.0-7	The RISTM shall be an accurate geometric representation of the satellite physical configuration in order to produce and predict satellite thermal performance during all phases of the mission from pre-launch through mission EOL.
SCCDRL746	3.108.0-8	The RISTM shall employ a unique numbering system, which applies to node numbers, conductor numbers, array numbers, and user constants. The numbering system for the spacecraft shall be as follows: 0 to 29,999 reserved for the spacecraft model; 30,000 to 99,000 for instrument models, 99,990 to 99,998 reserved for radiation junk nodes; 99,999 reserved for the space node.
SCCDRL747	3.108.0-9	The RISTM shall include a geometric math model (GMM) that contains between 200 and 1000 spacecraft surfaces to calculate radiation couplings and environmental heat fluxes, and a thermal math model (TMM) that contains between 200 and 500 spacecraft nodes to calculate the heat transfer and resultant temperatures.
SCCDRL748	3.108.0-10	With regard to the Reduced Integrated Satellite Thermal Model, GMMs shall be in Thermal Desktop format.
SCCDRL749	3.108.0-11	With regard to the Reduced Integrated Satellite Thermal Model, TMMs shall be in The Systems Improved Numerical Differencing Analyzer 85 (SINDA85) format.
SCCDRL750	3.108.0-12	The RISTM submissions shall have the GMM and TMM embedded in a Thermal Desktop (TD) format.
SCCDRL751	3.108.0-13	The RISTM shall use units of millimeters for length, seconds for time, Watts for energy, and Celsius for temperature.
SCCDRL752	3.108.0-14	The RISTM shall support both steady-state and transient solutions.
SCCDRL753	3.108.0-15	The RISTM shall represent all flight environments and mission modes from pre-launch through mission life, as well as the environments of the thermal balance and thermal vacuum tests.

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SCCDRL754	3.108.0-16	<p>The RISTM analysis cases for flight temperature/heater-power predictions shall include, but not be limited to, operation and storage in geosynchronous orbit during:</p> <ul style="list-style-type: none"> a) Winter solstice (or hot case) , b) Summer solstice, c) Equinox/eclipse (or cold case), d) Solar declinations of 8.7° north and 8.7° south e) Other cases which stress elements of the thermal control system or those required to validate either the spacecraft or instrument designs f) Launch and ascent (delivered with second delivery submission), g) Transfer orbit (delivered with second delivery submission).
SCCDRL112 7	3.108.0-17	<p>Thermal models shall employ the concurrent worst case biasing of variables including, but not limited to:</p> <ul style="list-style-type: none"> a) Coatings thermal optical properties, including Beginning-of-Life (BOL) and End-of-Life (EOL) b) Heat dissipations, c) Conductances, d) Environmental inputs (solar, earth IR, albedo), e) Insulation effectiveness, f) Active system operating parameters.
SCCDRL755	3.108.0-18	<p>The RISTM range of variables shall include allowance for natural variations, measurement uncertainties, manufacturing and assembly tolerances, degradation over the mission life, and contamination.</p>
SCCDRL756	3.108.0-19	<p>Any subroutines used within RISTM shall be submitted with the RISTM.</p>
SCCDRL757	3.108.0-20	<p>Apertures, radiators, and other surfaces of special interest shall be modeled (nodalized) individually in the RISTM.</p>
SCCDRL758	3.108.0-21	<p>Unique nodes of a RISTM shall represent every dissipating component, assembly and subassembly.</p>
SCCDRL759	3.108.0-22	<p>Every flight temperature sensor in the RISTM shall be represented by a unique node.</p>
SCCDRL760	3.108.0-23	<p>Every satellite surface within the FOV of instrument apertures or radiators in the RISTM shall be represented by a GMM surface and TMM node that represents its temperature.</p>
SCCDRL761	3.108.0-24	<p>Geometry and coatings properties in the RISTM shall be traceable to the physical reality of the spacecraft hardware.</p>
SCCDRL762	3.108.0-25	<p>The RISTM shall represent all spacecraft/instrument configurations that require analysis; for example, launch configuration with optical cover closed and science configuration with optical cover open.</p>
SCCDRL763	3.108.0-26	<p>The RISTM model nodes or surfaces using adiabatic surfaces or arithmetic nodes (zero mass nodes) shall be noted in accompanying model documentation.</p>
SCCDRL764	3.108.0-27	<p>The RISTM spacecraft sub model names, optical & thermophysical properties, TD symbols, and component names shall have the prefix "SC".</p>

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SCCDRL765	3.108.0-28	The RISTM file names shall be representative of their appropriate analysis case; files include but are not limited to the SINDA input file and radk, heatrate, and output files.
SCCDRL766	3.108.0-29	The RISTM accompanying documentation shall include a listing of all included GMM and TMM files, including filename, description, and format (Thermal Desktop, SINDA).
SCCDRL767	3.108.0-30	The Reduced Integrated Satellite Thermal Model shall be correlated against the system level thermal balance test data.
SCCDRL768	3.108.0-31	The RISTM shall be correlated against the system level thermal balance test data to temperatures within 3°C and unit energy balance within 3 %.
SCCDRL769	3.108.0-32	<p>The RISTM Report shall include:</p> <ul style="list-style-type: none"> a) The version/date of: The RISTM being discussed, the reduced spacecraft model and the reduced instrument models used. b) Tables delineating: node/surface number, node/surface brief description, node area, predominant materials and surface finishes, and electrical dissipation range for operating, non-operating and other modes. c) A summary of the spacecraft and instrument back loading to each instrument, including radiant and conductive heat transfer from instrument to instrument and spacecraft to instrument, d) A table listing all thermal control coatings (BOL & EOL values) referenced to model surface finish designators. e) A discussion of the correlation of the RISTM and the DISTM, that documents that the corresponding temperatures agree within 2 °C and heater powers agree within 3% for any set of boundary conditions. f) Heater power dissipation ranges for all operating and non-operating modes including the bus voltage variations g) Type of control for each heater h) Rated power at spacecraft voltage for each heater i) The designator and relationship of the closest representative flight temperature sensor. j) The TMM and GMM upon which the report is based and any other required accompanying information and sample run results. k) Transient plots of special interest. l) Power profiles of varying dissipations and explain when they apply. m) Documentation of the model correlation activity and incorporate applicable test data and flight data to refine and correlate the model. n) Descriptions of the GMM and TMM variations that represent the various spacecraft/satellite configurations such as aperture open/closed, solar array stowed/deployed. o) Sketches/figures showing: The overall layout of the satellite with dimensions and with significant features of the spacecraft and instrument thermal control systems identified. p) Sketches/figures showing: How nodes and surfaces correspond to components. q) Notation of the surfaces/nodes that had to be deleted from the reduced spacecraft and instrument models to produce the RISTM. r) A list of instrument model alterations
SCCDRL770	3.109	3.109 Detailed Integrated Satellite Thermal Model

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SCCDRL771	3.109.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-THER-02 2. <u>Title:</u> DETAILED INTEGRATED SATELLITE THERMAL MODEL 3. <u>Use:</u> The detailed spacecraft thermal model and the reduced instrument thermal models will be combined to obtain a Detailed Integrated Satellite Thermal 4. <u>Preparation Information:</u>
SCCDRL772	3.109.0-2	The reduced Instrument thermal models (furnished by the government) shall be incorporated with the detailed spacecraft thermal model to form a DISTM.
SCCDRL773	3.109.0-3	<p>This DISTM shall be used to:</p> <ol style="list-style-type: none"> a) Demonstrate the adequacy of the thermal design to meet the temperatures, temperature gradients, and heater power requirements, both explicit and derived, under worst-case hot and cold environments for all mission phases and operating modes. b) Verify all thermal interface (ICD) requirements between the Spacecraft and the Instruments.
SCCDRL774	3.109.0-4	This DISTM shall be delivered to the government and will be subject to inspection.
SCCDRL775	3.109.0-5	The DISTM shall adhere to the same requirements as the RISTM.(see CDRL SC-THER-01)
SCCDRL776	3.109.0-6	The DISTM shall support both steady-state and transient solutions.
SCCDRL777	3.109.0-7	The DISTM shall demonstrate achievement of all defined requirements for temperature, temperature gradients, and heater power.
SCCDRL778	3.109.0-8	Geometry and coatings properties of the DISTM shall be traceable to the physical reality of the satellite hardware.
SCCDRL779	3.109.0-9	TMM nodes in the DISTM not represented in the GMM shall have the following information listed in the accompanying model documentation broken down by node: node number, description, dissipation, properties.
SCCDRL780	3.109.0-10	The DISTM cases shall include the same first five analysis cases as the RISTM and represent the same flight environments and mission modes.
SCCDRL781	3.110	3.110 Thermal Performance Report
SCCDRL782	3.110.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-THER-03 2. <u>Title:</u> THERMAL PERFORMANCE REPORT 3. <u>Use:</u> The Thermal Performance Report is used to evaluate the adequacy of the thermal design to meet requirements, both explicit and derived, under worst hot and cold case environments for all mission phases and operating modes. 4. <u>Preparation Information:</u>

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SCCDRL783	3.110.0-2	<p>The Thermal Performance Report shall include a complete tabular list of the operating and non-operating Qualification, Protoflight, Acceptance, and Mission Allowable Temperatures (MATs) for the spacecraft and instrument components referenced to thermal model node numbers:</p> <ol style="list-style-type: none"> Spacecraft and instrument component temperature predictions from the RISTM and DISTM comparing their operating and non-operating MATs, noting temperature margins. Spacecraft and instrument component heater power predictions for the flight cases, as defined later in this DID, compared to their heater capability, noting heater power margins. Temperature and heater power predictions for the wetted portions of the propulsion system as a function of time of year and satellite operating mode. All thermal engineering assumptions and parameters (i.e., detailed component power distribution breakdown, solar absorptances, emittances, solar and Earth's albedo inputs) that are used in the thermal analyses.
SCCDRL784	3.110.0-3	<p>The following flight cases shall be used for the spacecraft and instrument component temperature predictions and component heater power predictions from the RISTM and DISTM:</p> <ol style="list-style-type: none"> Summer and Winter solstice North 8.7 °and South 8.7° Equinox and Equinox eclipse Launch/ascent Orbit storage Any other thermally significant Spacecraft or Instrument condition for all satellite operating modes
SCCDRL785	3.110.0-4	<p>The Thermal Performance Report shall include:</p> <ol style="list-style-type: none"> Uncertainties and/or margins included in the temperature predictions and a detailed description of how they were determined. All flight thermal sensors and their locations on the satellite including drawings depicting their locations All flight heaters, their power capability, control, and their locations on the satellite including drawings depicting their locations Applicable test data and flight data to substantiate requirement compliance. Updates with flight data for all cases analyzed after one year in orbit.
SCCDRL786	3.111	<h3>3.111 Thermal Environment for GFP Instruments</h3>
SCCDRL787	3.111.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <u>CDRL No:</u> SC-THER-04 <u>Title:</u> THERMAL ENVIRONMENT FOR GFP INSTRUMENTS <u>Use:</u> This document describes the on-orbit thermal environment for the individual GFP Instruments. <p>This information permits stand-alone instrument models to predict thermal performance when integrated to the GOES-R satellite models.</p>

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL787	3.111.0-1	To restrict proprietary and competitive information flow between instrument contractors, the spacecraft contractor will provide and maintain variant(s) of the RISTM. Instrument vendors intent on concealing design information (from competitors) may provide instrument thermal models with accurate external information but devoid of internal details, called shell models. The spacecraft contractor will incorporate these shell models replacing the instrument reduced models.
4. <u>Preparation Information:</u>		
SCCDRL788	3.111.0-2	A separate thermal environment shall be delivered for each GFP Instrument and based upon and delivered with an up-to-date RISTM.
SCCDRL789	3.111.0-3	Each instrument vendor shall be supplied model variants with competitors shell models.
SCCDRL790	3.111.0-4	The RISTM for the Thermal Environment for GFP Instruments shall be consistent with specifications listed in the RISTM DID.
SCCDRL791	3.111.0-5	The model sample runs for the Thermal Environment for GFP Instruments shall include the expected worst hot and worst cold cases for the particular GFP instrument, as well as survival and launch/ascent/transfer orbit cases.
SCCDRL792	3.111.0-6	Thermal Environment for GFP Instruments shall present: <ul style="list-style-type: none"> a) Orbit parameters for the bounding cases b) Thermal flux parameters (e.g. Solar) c) Thermal optical properties for satellite surfaces (absorptance, emittance, specularity) d) The date and version designators for the GFP models e) Satellite temperature summary for all sample run cases listed above, compared against temperature and heater power requirements
SCCDRL793	3.111.0-7	Thermal Environment for GFP Instruments shall include figures showing at least the overall layout of the satellite, including internal and external spacecraft details.
SCCDRL794	3.111.0-8	TMM in the Thermal Environment for GFP Instruments shall include figures/sketches showing how nodes and surfaces correspond to satellite components.
SCCDRL795	3.111.0-9	The report for the Thermal Environment for GFP Instruments shall note the surfaces/nodes that must be deleted by the instrument integrator during model integration.
SCCDRL796	3.112	3.112 GN&C Algorithm Document
SCCDRL797	3.112.0-1	DESCRIPTION OF REQUIRED DATA <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-GN&C-01 2. <u>Title:</u> GN&C ALGORITHM DOCUMENT 3. <u>Use:</u> To fully describe all the GN&C algorithms that will be used and coded in flight software. <p>This document provides intermediary information that the flight software personnel can use to write the flight code from the GN&C specification and other subsystem information, where the specification or subsystem information is too high-level or esoteric to permit easy coding by programmers not familiar with subsystem design and operation.</p>

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL797	3.112.0-1	This document can be used by the mission operations flight team to maintain the GN&C flight software in the advent of an anomaly.
		4. <u>Preparation Information:</u>
SCCDRL798	3.112.0-2	The GN&C Algorithm Document shall describe the GN&C algorithms.
SCCDRL799	3.112.0-3	<p>The GN&C Algorithm Document shall:</p> <ol style="list-style-type: none"> a) Include textual descriptions of each algorithm and diagrams such as mode-transition diagrams data flow diagrams, structure charts, and control diagrams. b) Describe each algorithm in terms of inputs, outputs, and processing. c) Define software interfaces and internal variables, execution rates, deadlines, operational constraints, and restrictions. d) Define the units of all software constants and variables. e) Define the default values for the software constants and the variables.
SCCDRL111 2	3.113	3.113 GN&C Sensor Models
SCCDRL800	3.113.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-GN&C-02 2. <u>Title:</u> GN&C SENSOR MODELS 3. <u>Use:</u> Attitude determination performance is simulated using models of all sensors. Since these models are critical to attitude determination performance they will have a direct impact on INR, insight is required for use in the projects in-house Matlab/Simulink analysis tools. <p>4. <u>Preparation Information:</u></p>
SCCDRL802	3.113.0-2	The GN&C Sensor Models shall contain the high fidelity analytical model of all sensors that are used to simulate attitude determination performance.
SCCDRL803	3.113.0-3	The delivery for each GN&C Sensor Model shall be in Matlab/Simulink.
SCCDRL804	3.113.0-4	The code for each GN&C Sensor Model shall be fully commented including definitions of all inputs, outputs, constants and variables.
SCCDRL805	3.113.0-5	Units of each parameter for each GN&C Sensor Model shall be defined.
SCCDRL806	3.114	3.114 Satellite Telemetry and Command Handbook

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SCCDRL807	3.114.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: SC-C&DH-01 2. <u>Title</u>: SATELLITE TELEMETRY AND COMMAND HANDBOOK 3. <u>Use</u>: The mechanism for moving telemetry and command packets between the spacecraft and ground is the CCSDS Advanced Orbiting System (AOS) Transfer Frame (TF). The Satellite Telemetry and Command Handbook (ST&C) describes AOS Transfer Frames used by GOES-R. 4. <u>Preparation Information</u>:
SCCDRL808	3.114.0-2	All telemetry in the ST&C Handbook shall be identified using packet APIDs and labels.
SCCDRL809	3.114.0-3	Packet APIDs in the ST&C Handbook shall be grouped by spacecraft subsystem, instrument, and payload component.
SCCDRL115 3	3.114.0-4	Each GFP Instrument Contractor will supply their T&C inputs to the Spacecraft Contractor.
SCCDRL810	3.114.0-5	The telemetry list in the ST&C Handbook shall contain a detailed listing of all telemetry points including those needed for anomaly resolution and de-orbit operations.
SCCDRL811	3.114.0-6	The telemetry list in the ST&C Handbook shall contain key parameters and information necessary for the description and interpretation of all telemetry points, including spares.
SCCDRL812	3.114.0-7	The telemetry list in the ST&C Handbook shall contain a description of each telemetry point and what it is measuring, engineering units, A to D resolution if appropriate, calibration data if appropriate, and green-yellow-red limits.
SCCDRL813	3.114.0-8	The telemetry list in the ST&C Handbook shall contain default, minimum, and maximum sample rates.
SCCDRL814	3.114.0-9	The command list of the ST&C Handbook shall contain source packet APIDs by VCID and detailed TF data zone content descriptions.
SCCDRL815	3.114.0-10	The command list in the ST&C Handbook shall contain detailed listing of all commands that can be applied to the spacecraft affecting configuration and operation in any way while in test or on orbit.
SCCDRL816	3.114.0-11	The command list in the ST&C Handbook shall contain key parameters necessary for describing the command and its function.
SCCDRL817	3.114.0-12	The command list in the ST&C Handbook shall contain description of command requirements information needed to understand the command's effect on the spacecraft and subsystems
SCCDRL818	3.114.0-13	The ST&C Handbook shall contain cross referenced listings of all commands and the telemetry points they effect. Two versions of this list are required. The first is a listing by command APID and identifier and the second is a listing by telemetry APID and identifier.
SCCDRL819	3.114.0-14	The ST&C Handbook shall provide detailed primary and secondary source packet header and data zone content definitions.
SCCDRL820	3.114.0-15	If CRCs are used, their computational algorithms shall be listed in the ST&C Handbook.
SCCDRL821	3.114.0-16	The ST&C Handbook shall contain detailed TF header format definitions for all downlink telemetry and uplink commands.

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SCCDRL822	3.114.0-17	The ST&C Handbook shall list all telemetry TFs and include Master Channel ID (MCID), Virtual Channel ID (VCID), Virtual Channel Frame Count, Signaling Field, and Frame Error Control if used.
SCCDRL823	3.114.0-18	The telemetry TF list of the ST&C Handbook shall include, as a minimum, mapping of source packet APID to downlink VCID, telemetry packet source, and packet description.
SCCDRL824	3.114.0-19	The S&TC Handbook shall list all command TFs and include Transfer Frame Version Number, Bypass Flag, Control Command Flag, Spacecraft Identifier, VCID, Frame Length, and Frame Sequence Number.
SCCDRL825	3.114.0-20	Each release of the ST&C Handbook shall be delivered electronically and via hard copy.
SCCDRL826	3.115	3.115 Satellite Telemetry and Command Database
SCCDRL827	3.115.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> SC-C&DH-02 2. <u>Title:</u> SATELLITE TELEMETRY AND COMMAND DATABASE 3. <u>Use:</u> The Satellite Telemetry and Command (T&C) Database integrates all instrument and spacecraft T&C databases into a common T&C data management system. This database is needed for Integration and Test (I&T) and satellite operations. 4. <u>Preparation Information:</u>
SCCDRL828	3.115.0-2	The Satellite Telemetry and Command Database shall include all data items and parameters necessary to operate the instrument and spacecraft bus during ground test, launch and orbit raising, and all phases of on orbit operations.
SCCDRL829	3.115.0-3	The Satellite Telemetry and Command Database shall contain all data items, cross references, and other features listed in the spacecraft and instrument's T&C Handbooks.
SCCDRL830	3.116	3.116 Communications Link Analysis and Link Budgets
SCCDRL831	3.116.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> SC-COMM-01 2. <u>Title:</u> COMMUNICATIONS LINK ANALYSIS AND LINK BUDGETS 3. <u>Use:</u> The Bit Error Rate (BER) degradation analyses (link budget) and modeling demonstrates that the GOES-R communications subsystem meets its performance requirements. The Communications Link Analysis and Link Budgets describe the work necessary to verify the performance of the communications subsystem as the program matures, concluding with the data for post-launch testing. 4. <u>Preparation Information:</u>
SCCDRL832	3.116.0-2	The Program States for the Communications Link Analysis and Link Budgets shall include: a) The Proposal Communications Link Analysis and Link Budget Report which contains the link budget in an Excel work book with clarifying explanations. b) The PDR Communications Link Analysis and Link Budget Report which includes the

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SCCDRL832	3.116.0-2	<p>Communications Subsystem Performance Analysis Report and the Communications Subsystem Unit Computer Simulation Report and updates the Proposal Communications Link Analysis and Link Budget Report accordingly.</p> <ul style="list-style-type: none"> c) The CDR Communications Link Analysis and Link Budget Report which incorporates any updates of the Communications Subsystem Performance Analysis Report and the Communications Subsystem Unit Computer Simulation Report and updates the PDR Communications Link Analysis and Link Budget Report accordingly. d) The Pre-Thermal Vacuum Communications Link Analysis and Link Budget Report which replaces unit level specification values in the CDR Communications Link Analysis and Link Budget Report with the measured unit values and updates the link budget accordingly. These values are used to predict thermal vacuum performance for the paths that will be tested in thermal vacuum. e) The Post thermal vacuum Communications Link Analysis and Link Budget Report update to Link Budget Report which updates the Pre-Thermal Vacuum Communications Link Analysis and Link Budget Report with any changes that result from thermal vacuum testing. f) The Pre-launch Communications Link Analysis and Link Budget Report which show predicted performance to CDAS (Wallops) for the paths specified by the Government for the post launch testing and incorporating the antenna patterns and any other updates.
SCCDRL833	3.116.0-3	<p>The Proposal Communications Link Analysis and Link Budget Report shall include the following:</p> <ul style="list-style-type: none"> a) The spreadsheets for the Communications Link Budgets documented with explanations where necessary to describe the methodology used in the spreadsheet and any supporting technical analysis. b) Link margins calculated with the CCSDS RF Modulation Standard as a guide. c) The Communications Link Budgets that describe and present the predicted performance of the spacecraft communication subsystem and link margins. See attached file: GOES-R Communications Link Budgets Worksheet. d) The Communications Link Budgets spreadsheets completed by adding the contractor's values to the empty cells and by adding additional cells to provide additional detail of the link impairments. e) The Communications Link Budgets spreadsheet containing at a minimum, narrative, explanation of any additional formula used and any model data and analysis, as appropriate and be updated as additional analysis and measured impairment data (e.g. spurs, crosstalk, and antenna polarization isolation) becomes available.
SCCDRL118 2	3.116.0-4	<p>The PDR Communications Subsystem Unit Computer Simulation Report of the Communications Link Analysis and Link Budget Report shall include the following:</p> <ul style="list-style-type: none"> a) A description of the predicted and measured performance of each Communication Subsystem unit at acceptance temperature. b) An update for each change in either the communications or T & C subsystem. c) The format which is a tabulated printout data in Word and Excel format showing the transfer function of the unit's time or frequency domain performance. d) The AGC time constants of the DCPR transponder modeled with the corresponding time constants of the Wallops receiver to determine the effect of the time constants on the BER (bit error rate).

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SCCDRL834	3.116.0-5	<p>The PDR Communications Link Analysis and Link Budget Report shall include the following:</p> <ol style="list-style-type: none">a) The link budget updated with the results of the Communications Subsystem Unit and the Computer Simulation Report described below.b) The Communications Subsystem Performance Analysis Report and the Communications Subsystem Unit Computer Simulation delivered to the Government with updates as available.
SCCDRL836	3.116.0-6	<p>The PDR Communications Subsystem Unit Computer Simulation of the Communications Link Analysis and Link Budget Report shall contain at a minimum, the following:</p> <ol style="list-style-type: none">a) Receiver and transmitter gain transfer curves.b) Channelization and multiplexer filters performance over frequency.c) Predicted transfer orbit T&C antenna patterns in tabular and graphical form.d) Unit performance over frequency and temperature.e) Effect of time constants on DCPR channel performance.f) Composite coverage and polarization patterns for the T&C antenna system showing the effects of all radiating elements. Composite patterns may be derived analytically using an appropriate modeling tool. The amplitude and phase measurements of each discrete radiating element shall be used as model inputs. The modeling may use representative elements and scattering structures of the satellite in flight configuration<ol style="list-style-type: none">1) All antenna patterns shall be determined at the assigned operating frequency or at lower edge and upper edge for antennas which provide for multiple carriers.2) Each antenna pattern data shall be referenced to an isotropic antenna and the spacecraft axis.3) All antenna pattern data shall be delivered in tabular and graphical format with on-orbit antenna coverage and polarization patterns with no greater than 1 degree increment over twice the on-orbit coverage range with the spacecraft configured in the on-orbit (deployed) configuration.
SCCDRL837	3.116.0-7	<p>The PDR Communications Subsystem Performance Analysis Report of the Communications Link Analysis and Link Budget Report shall include:</p> <ol style="list-style-type: none">a) Modeling of the BER degradation due to digital transmission channel impairments such as filters, linearity effects (e.g., intermodulation noise, AM/PM conversion) and spurious signals including:<ol style="list-style-type: none">1) Analysis of the frequency and channelization plan addressing self-interference, mutual interference, cross channel interference, filter and isolation requirements with the on-orbit antennas field of view predictions.2) Transmission channel distortions and impairment analysis including: center frequency, signal path gain distribution, gain transfer curves, dynamic range, RF bandwidth, G/T, channel isolation, overload protection, phase linearity, gain flatness, carrier phase noise, AM/AM and AM/PM conversion, spurious PM, incidental AM, EIRP, axial ratio, C/N, spurious outputs, frequency stability, noise figure, time delay, active and passive intermodulation and BER.3) The following technical performance parameters of the GOES-R Spacecraft communications subsystem hardware shall be presented in tabular form: Unit gain, loss, bandwidth, noise temperature, amplifier power, and EIRP. The gain/loss tabulation which include as a minimum each connector, waveguide section, flange VSWR, diplexer loss, switch loss, SIT pads, amplifier gain and power, amplifier backoff, transmit and receive antenna gains, EIRP, pre-amp gain, VSWR effects and pre-amp and transponder noise temperature calculation. The document provides

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SCCDRL837	3.116.0-7	<p>separately the tolerance of each channel or service parameter, and BOL/EOL margins. The RF portion of the command and telemetry functions included. The tabulated data delivered in Excel spreadsheet compatible files with the applicable formulas. The Communications Subsystem Unit Computer Simulation Report values can serve as an input into this model. This report will be organized by transponder performance, not unit performance</p> <p>4) Analyses for all operating modes and configurations.</p>
SCCDRL838	3.116.0-8	The CDR Communications Link Analysis and Link Budget Report shall update the PDR Communications Link Analysis and Link Budget Report with any further modeling results.
SCCDRL839	3.116.0-9	The Pre-Thermal the Communications Link Analysis and Link Budget Report shall update the CDR Communications Link Analysis and Link Budgets with actual unit data for the spacecraft under test and predict the performance in thermal vacuum for the paths to be tested.
SCCDRL840	3.116.0-10	The Pre-Thermal each spacecraft shall have its own Communications Link Analysis and Link Budget Report with the appropriate unit level data.
SCCDRL841	3.116.0-11	The Post-Thermal the Communications Link Analysis and Link Budget Report shall update the Pre-Thermal Vacuum Communications Link Analysis and Link Budgets: based on the results of the thermal vacuum measurements and any other new data or analysis.
SCCDRL842	3.116.0-12	The Pre-Launch the Communications Link Analysis and Link Budget Report shall update the Post-Thermal Vacuum Communications Link Analysis and Link Budget report with any new analysis or measurements and predict performance to be measured at CDAS or the back-up CDAS. The predicted performance will be compared to the measured in-orbit spacecraft performance.
SCCDRL843	3.117	3.117 Selection of Raw Data and GRB FEC Coding and Modulation
SCCDRL844	3.117.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-COMM-02 2. <u>Title:</u> SELECTION OF RAW DATA AND GRB FEC CODING AND MODULATION 3. <u>Use:</u> The Selection of Raw Data and GRB FEC Coding and Modulation documents the rationale behind the choice of coding and modulation for the GOES-R Raw and GRB links. 4. <u>Preparation Information:</u>
SCCDRL845	3.117.0-2	<p>The Selection of Raw Data and GRB FEC Coding and Modulation shall include narrative and explanation, with supporting analysis, of the benefits and drawbacks of the selected and competing choices and address the following:</p> <ol style="list-style-type: none"> a) Power efficiency b) Bandwidth efficiency c) Robustness of selected choice to expected interference environment d) Cost and availability of space flight hardware and commercially available ground decoders
SCCDRL846	3.118	3.118 Communications Subsystem Unit Test Data Reports

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SCCDRL847	3.118.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-COMM-03 2. <u>Title:</u> COMMUNICATIONS SUBSYSTEM UNIT TEST DATA REPORTS 3. <u>Use:</u> To provide results of communications unit test in one report at the completion of unit testing. 4. <u>Preparation Information:</u>
SCCDRL848	3.118.0-2	The Communications Subsystem Unit Test Data Reports shall contain acceptance data measurements for LNAs, filters, receivers, HPAs, and antennas. Data on switches and hybrids do not have to be included.
SCCDRL849	3.118.0-3	<p>The Communications Subsystem Unit Test Data Reports shall include the following:</p> <ol style="list-style-type: none"> a) Test results of reworked units with results arranged by type of unit with all units of one type grouped together (including any regression testing). b) Analysis to show that bit error rate data has the confidence level that is agreed upon by the contractor and the Government (e.g. typically 95%) at the required Eb/No. c) All information not available at the system level such as SSPA, input power versus output power, and showing operating point.
SCCDRL850	3.119	3.119 Multipaction and Corona Test and Analysis Report
SCCDRL851	3.119.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-COMM-04 2. <u>Title:</u> MULTIPACTION AND CORONA TEST AND ANALYSIS REPORT 3. <u>Use:</u> The Multipaction and Corona Test and Analysis Report documents the tests and analysis that are performed on the spacecraft RF components and units to ensure adequate protection (with approved safety margins) has been provided for all potentially hazardous RF conditions. 4. <u>Preparation Information:</u>
SCCDRL852	3.119.0-2	The Multipaction and Corona Test and Analysis Report shall include multipaction and corona, plus any other RF condition that (in the contractor's opinion) may cause harm, or allow harm to be caused, to any component or subsystem on the spacecraft.
SCCDRL853	3.119.0-3	<p>The Multipaction and Corona Test and Analysis Report shall include following information as a minimum:</p> <ol style="list-style-type: none"> a) An item by item list of all components that could be subject to hazardous RF conditions. Provided as part of the PDR and subject to approval and discussion during the PDR. A revised copy provided for approval as part of the CDR. b) Analysis of the worst case RF level, the associated safety factors that will be applied to each component, and the theoretical or practical basis used to derive such safety factors; provided as part of the PDR and subject to approval and discussion during the PDR. A revised copy provided for approval as part of the CDR. c) Reports of all tests performed by the contractor or its suppliers to show each component will be able to withstand the predicted worst case RF levels. Provided at least 60 days prior to the start of test at the communications system level with all measurement results.

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SCCDRL854	3.119.0-4	All issues of the Multipaction and Corona Test and Analysis Report shall be provided in a standard electronic format.
SCCDRL855	3.120	3.120 Communications Subsystem Information Required for ITU and NTIA Filings
SCCDRL856	3.120.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> SC-COMM-05 <li>2. <u>Title:</u> Communications Subsystem Information Required for ITU and NTIA Filings <li>3. <u>Use:</u> The Communication Subsystem Information Required for ITU and NTIA Filings deliverable provides the measured (or calculated, if measured data cannot be obtained) data required to support NOAA filing with ITU and NTIA for authorization to operate on the frequencies that will be used by the GOES-R series spacecraft. <li>4. <u>Preparation Information:</u>
SCCDRL857	3.120.0-2	<p>The Communication Subsystem Information Required for ITU and NTIA Filings deliverable shall provide the following information for each signal, as a minimum:</p> <ol style="list-style-type: none"> <li>a) For each transmission from the spacecraft: <ol style="list-style-type: none"> <li>1) Power of the desired emission applied to the antenna connector <li>2) Maximum spurious relative to the desired emission <li>3) Harmonic levels: 2nd, 3rd, Other <li>4) Emission bandwidth: 3 dB, 20 dB, 60 dB <li>b) For each signal received by the spacecraft: <ol style="list-style-type: none"> <li>1) RF selectivity: 3 dB, 20 dB, 60 dB <li>2) IF selectivity: 3 dB, 20 dB, 60 dB <li>3) IF frequency <li>4) Frequency of the first local oscillator <li>5) Spurious rejection <li>6) Image rejection <li>7) Receive system noise temperature referenced to the antenna connector <li>c) For each antenna used on the spacecraft: <ol style="list-style-type: none"> <li>1) Basic physical type <li>2) Manufacturer's name and model number <li>3) Operating frequency range <li>4) Polarization type and orientation angle <li>5) Peak antenna gain referenced to the antenna connector <li>6) 1st sidelobe gain and angle from main lobe peak <li>7) Half Power Beam Width, parallel and at 90° to, the polarization orientation angle <li>8) Radiation pattern measurements covering 4-Pi steradians with no greater than one degree increments for one axis and no more than 15 degree increments for the other axis. The amplitude and phase measurements for each discrete radiating element

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SCCDRL857	3.120.0-2	<p>used as inputs to the analytic model.</p> <p>9) Co-polar and cross-polar radiation pattern measurements. The amplitude and phase measurements for each discrete radiating element used as inputs to the analytic model.</p> <p>10) Composite coverage and polarization patterns for any combination of two or more antennae that are used to simultaneously transmit or receive the same signal(s).</p> <p>11) Predicted coverage contours of G/T and EIRP (in dB relative to the beam peak) for spacecraft located at longitudes 75°, 90°, 105°, and 137° west, using equi-rectangular (Plate-Carre)" projection and showing visible continents, countries.</p> <p>12) All antenna measurements performed at the assigned operating frequency or at the lower edge and upper edge for antennas that provide for multiple carriers. For any antenna operating over multiple, discontinuous, frequency bands, measurements performed at the upper and lower edges of each operating band.</p> <p>13) All antenna pattern data referenced to an isotropic antenna and the spacecraft axes.</p>
SCCDRL858	3.120.0-3	All data shall be provided in a standard electronic format.
SCCDRL859	3.120.0-4	If subsequent measurements on flight hardware show performance differences from the preliminary data, a revised report of the relevant subsection(s) shall be delivered not later than 60 calendar days after the measurements are made.
SCCDRL860	3.121	3.121 Communications Subsystem Test Data Reports
SCCDRL861	3.121.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <p>1. <u>CDRL No:</u> SC-COMM-06</p> <p>2. <u>Title:</u> COMMUNICATIONS SUBSYSTEM TEST DATA REPORTS</p> <p>3. <u>Use:</u> The Communications Subsystem Test Data Reports provide detailed system test summary which will trend system level through system integration through final system performance.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL862	3.121.0-2	The Communications Subsystem Test Data Reports shall ensure that each spacecraft have its own volume.
SCCDRL863	3.121.0-3	<p>The Communications Subsystem Test Data Reports shall include, at a minimum, the following data:</p> <ol style="list-style-type: none"> Gain transfer curves Power to antenna Bit Error Rate (BER) (directly measured or indirectly such as from Error Vector Magnitude) curves vs. "uplink" power Amplitude vs. frequency of each transponder (with and without Automatic Gain Control (AGC)) High Powered Amplifier (HPA) drain currents Spurs Noise Power Ratio (NPR) for Data Collection Platform Relay (DCPR) transponder Absolute frequency, frequency translation and frequency stability

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SCCDRL864	3.121.0-4	<p>The Communications Subsystem Test Data Reports shall include the following Telemetry, Tracking, Command related information:</p> <ol style="list-style-type: none"> a) Command sensitivity b) Minimum command amplitude lock/unlock power c) Command frequency lock/unlock range d) Ranging modulation index e) Absolute time delay
SCCDRL865	3.121.0-5	<p>Each measurement in the Communications Subsystem Test Data Reports shall be trended from the completion of the Low Noise Amplifier (LNA)/receiver, filter, HPA, output filter chain through ambient, thermal vacuum, final ambient, and Radio Frequency Airlink (RFA) testing plus any other system level tests including any regression testing that is required.</p>
SCCDRL866	3.122	<p>3.122 Electromagnetic Interference (EMI) / Electromagnetic Compatibility (EMC) Plan</p>
SCCDRL867	3.122.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-POWR-01 2. <u>Title:</u> ELECTROMAGNETIC INTERFERENCE (EMI) / ELECTROMAGNETIC COMPATIBILITY (EMC) PLAN 3. <u>Use:</u> This document describes the design and test verification methods that will be used to ensure that the spacecraft will be compatible with the performance requirements. 4. <u>Preparation Information:</u>
SCCDRL868	3.122.0-2	<p>The EMI/EMC Compatibility Plan shall include the following minimum material.</p> <ol style="list-style-type: none"> a) Description of how the spacecraft will be designed to ensure compatibility between the various subsystems, the launch vehicle, and all instruments. b) Design and test plans that will be used at the system, spacecraft, bus, subsystem and component levels. c) EMI/EMC test matrix that describes which components, and/or subsystems will be tested for Conducted Emissions, Conducted Susceptibility, Radiated Emissions, Radiated Susceptibility and Electrostatic Discharge. d) Description of the EMI/EMC and ESD Test Plans (to cover the FPGA ultra sensitive devices installed on some assemblies. Use handling procedures in accordance with Class Zero requirements.) e) Description of the proposed accept/reject test criteria that will be used at the system, spacecraft, bus, subsystem and component levels of assembly. f) Description of proposed design guidelines that will be employed to ensure that the EMI/EMC requirements will be met, such as bonding, grounding and isolation, wiring harnesses design, EED circuits, and shielding. g) Describe the plan for providing the predicted and measured values of the S/C radiated emission levels at the GFP instrument locations, especially the emissions into the GFP instrument apertures.

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SCCDRL869	3.122.0-3	The scope of the EMI/EMC Compatibility Plan shall include the spacecraft, instruments, and associated ground support equipment.
SCCDRL870	3.123	3.123 Spacecraft Power Energy Balance Model and Analysis
SCCDRL871	3.123.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> SC-POWR-02 <li>2. <u>Title:</u> SPACECRAFT POWER ENERGY BALANCE MODEL AND ANALYSIS <li>3. <u>Use:</u> This model will be used in the prediction of power loads levels and profiles during orbit raising and eclipse. <li>4. <u>Preparation Information:</u>
SCCDRL872	3.123.0-2	The Spacecraft Power Energy Balance Model and Analysis shall provide details of the power system steady-state performance as a function of load profiles and solar array illumination, (or alternate power source) for launch, on-orbit, and test configurations.
SCCDRL873	3.124	3.124 Power Subsystem Performance Analysis Report
SCCDRL874	3.124.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> SC-POWR-03 <li>2. <u>Title:</u> POWER SUBSYSTEM PERFORMANCE ANALYSIS REPORT <li>3. <u>Use:</u> To document the power subsystem performance analyses to assure the power subsystem design is meeting or exceeding the power requirements for all modes of operation. To document performance characterization of power electronics unit. <li>4. <u>Preparation Information:</u>
SCCDRL875	3.124.0-2	<p>The Power Subsystem Performance Analysis Report shall include the following:</p> <ol style="list-style-type: none"> <li>a) Power subsystem requirements & allocation <li>b) Power budget for all operating modes <li>c) Power subsystem verification matrix <li>d) Power subsystem failure modes and effects <li>e) Power subsystem reliability <li>f) Launch & orbit raising (LOR) power <li>g) Safe hold power <li>h) Power electronics design & performance <li>i) Power distribution design <li>j) Summary of battery design <li>k) Battery depth -of - discharge (DOD) for all operating modes <li>l) Solar array design parameters summary <li>m) Solar array deployment power

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SCCDRL876	3.125	3.125 Power Profile Report
SCCDRL877	3.125.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No</u>: SC-POWR-04 <li>2. <u>Title</u>: POWER PROFILE REPORT <li>3. <u>Use</u>: To establish the detailed and current performance requirements and capabilities for the power subsystem in all modes and phases of operation. To provide input data for the thermal mathematical models and for mission operations plans and procedures. <li>4. <u>Preparation Information</u>:
SCCDRL878	3.125.0-2	The Power Profile Report shall include all power loads for all phases of the mission from pre-launch (turn-on) operation through launch, transfer orbit, on-orbit storage, and orbital operation, including both sunlight orbit and eclipse orbit modes and phases.
SCCDRL879	3.125.0-3	<p>The power consuming elements of the Power Profile Report shall be broken down into, at least, the following:</p> <ol style="list-style-type: none"> <li>a) The elements that are individually controlled by command or automatic program. <li>b) Individual boxes or stacks, where a stack of boxes operates in combination as a single power consuming unit. <li>c) Converter and transmission losses.
SCCDRL880	3.125.0-4	<p>Power consumption in the Power Profile Report shall be broken down into, at least, the following categories:</p> <ol style="list-style-type: none"> <li>a) Maximum operating, minimum operating, and orbital average power values, including specific descriptions regarding duty cycles. <li>b) In-rush current peaks and peak transient current events.
SCCDRL881	3.125.0-5	In the Power Profile Report, the source and basis for the estimate (e.g., design estimate, bread board estimate, exact previous hardware measurement) of the data used to define the dissipation of each load shall be explicitly identified.
SCCDRL882	3.125.0-6	Solar array current and battery performance and margins in the Power Profile Report shall be provided along with source and descriptors for the data.
SCCDRL883	3.125.0-7	The Power Profile Report shall describe the power requirements for each satellite mode of operation.
SCCDRL884	3.125.0-8	Detailed power profiles in the Power Profile Report shall be presented, to the maximum extent possible, in both tabular and graphical form.
SCCDRL885	3.125.0-9	The Power Profile Report shall be updated for each spacecraft as parameters change.
SCCDRL886	3.126	3.126 Solar Panel & Solar Array Assembly Output Power Predictions
SCCDRL887	3.126.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No</u>: SC-POWR-05 <li>2. <u>Title</u>: SOLAR PANEL & SOLAR ARRAY ASSEMBLY OUTPUT POWER PREDICTIONS

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL887	3.126.0-1	<p>3. <u>Use:</u> To document Solar Panel & Solar Array Assembly Output Power Predictions and I-V characterization for future on-orbit verification and validation. To evaluate and sanity check GOES R series solar array radiation fluence degradation due to trapped protons, trapped electrons, and solar flare protons.</p> <p>4. <u>Preparation Information:</u></p>
SCCDRL888	3.126.0-2	The Solar Panel & Solar Array Assembly Output Power Predictions shall provide the solar panel and solar array assembly output power predictions and I-V characterizations at the solstices and equinoxes over the satellite mission life.
SCCDRL889	3.126.0-3	<p>The Solar Panel & Solar Array Assembly Output Power Predictions shall include the following:</p> <p>a) Solar panel and solar array assembly output power predictions and I-V characterization at summer solstice, winter solstice, autumnal equinox, and vernal equinox at the following mission milestones:</p> <ol style="list-style-type: none"> 1) Post launch solar array deployment 2) 2 years on-orbit storage 3) Beginning-of-life (BOL, 5 years on-orbit storage) 4) 10 years after solar array deployment (includes 5 years on-orbit storage and 5 years on-orbit operation) 5) End-of-life (EOL, includes 5 years on-orbit storage and 10 years on-orbit operation) <p>b) Solar panel and solar array assembly output power predictions and I-V characterization at summer solstice, winter solstice, autumnal equinox, and vernal equinox after a specific mission start date at the following mission milestones:</p> <ol style="list-style-type: none"> 1) 1st equinox or solstice after specific mission start date 2) 2 years on-orbit storage after mission start date 3) 5 years on-orbit storage after mission start date 4) 5 years on-orbit storage plus 5 years on-orbit operation after mission start date 5) 5 years on-orbit storage plus 10 year on-orbit operation after mission start date. <p>c) All factors supporting the predictions. Include in the list of factors:</p> <ol style="list-style-type: none"> 1) Solar constant 2) Sun angles 3) Seasonal declination intensity 4) Radiation degradation 5) Temperature degradation 6) Thermal-cycling loss 7) VCM contamination loss 8) Test/calibration error factor 9) Optical transmission loss factor 10) Any other factors <p>d) Solar panel temperatures at summer solstice, winter solstice, autumnal equinox, and vernal equinox at launch, 2 years on-orbit storage, 5 years on-orbit storage, 10 years after launch (5 years on-orbit storage and 5 years on-orbit operation), and 15 years after</p>

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SCCDRL889	3.126.0-3	<p>launch (5 years on-orbit storage and 10 years on-orbit operation).</p> <p>e) Solar panel temperature degradation factors for Pmp, Imp, and Vmp at launch, 2 years on-orbit storage, beginning-of-life (BOL, after 5 years on-orbit storage), 10 years after launch (5 years on-orbit storage and 5 years on-orbit operation), and end-of-life (EOL, after 5 years on-orbit storage and 10 years on-orbit operation).</p> <p>f) Radiation degradation factors due to trapped protons, trapped electrons, and solar flare protons at 2 years on-orbit storage, beginning-of-life (BOL, after 5 years on-orbit storage), 10 years after launch (5 years on-orbit storage and 5 years on-orbit operation), and end-of-life (EOL, after 5 years on-orbit storage and 10 years on-orbit operation).</p> <p>g) Rationales supporting radiation degradation factors by supplying the following 1 MeV fluences:</p> <ol style="list-style-type: none"> 1) Annual equivalent 1 MeV electron fluences due to trapped electrons for storage and on-orbit operation. 2) 10 MeV proton fluence due to solar flare protons and the conversion factor to 1 MeV electron fluence. 3) Total 1 MeV electron fluences due to trapped protons, electrons, and solar flare protons. 4) Plots of the normalized Isc, Voc, Imp, and Vmp vs. 1 MeV electron fluence for the GOES R series solar cell. <p>h) A brief summary of the solar cell design details with the following information:</p> <ol style="list-style-type: none"> 1) Solar cell manufacturer 2) Solar cell type 3) Solar cell size 4) BOL solar cell efficiency at maximum power 5) Solar cell Isc, Voc, Imp, and Vmp at 28 °C AMO 6) Solar cell electron and proton damage coefficients at energies ranging from .020 MeV to 200 MeV. 7) Cover glass thickness 8) Anti-reflective coating type 9) Anti-reflective coating manufacturer 10) Number of parallel solar strings 11) Number of solar cells in series per string 12) Number of solar string failures included in predictions
SCCDRL890	3.127	3.127 Battery Design and Performance Analysis Report
SCCDRL891	3.127.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-POWR-06 2. <u>Title:</u> BATTERY DESIGN AND PERFORMANCE ANALYSIS REPORT 3. <u>Use:</u> To document Battery Design and Performance Analysis to support on-orbit verification and validation and any future on-orbit anomaly investigations related to the GOES R series battery. To evaluate battery capacity and battery capacity degradation analysis & rationales. To evaluate battery depth-of-discharge (DOD) analysis to support on-orbit verification and validation. To

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL891	3.127.0-1	document the battery and cell charge/discharge voltage profile over mission life to support on-orbit verification and validation and any future on-orbit anomaly investigation. To evaluate battery thermal analysis to support on-orbit verification and validation and any future on-orbit anomaly investigation.
		4. <u>Preparation Information:</u>
SCCDRL892	3.127.0-2	The Battery Design and Performance Analysis Report shall include design, analysis, and test data to support on-orbit verification and validation and any future on-orbit anomaly investigation related to the battery.
SCCDRL893	3.127.0-3	The Battery Design and Performance Analysis Report shall include the following: <ol style="list-style-type: none">a) Battery nameplate capacity (C) analysis from beginning-of-life (BOL) to end-of-life (EOL), to include:<ol style="list-style-type: none">1) Process to maintain battery nameplate capacity (C) from BOL to EOL.2) Cell manufacturer process to establish a cell rated capacity (C) from measured cell capacity data at a specific temperature, discharge rate, and discharge voltage so that the rated cell capacity (C) and the battery nameplate capacity (C) is achieved from BOL to EOL.3) Cell manufacturer margin between the measured cell capacity and the cell rated capacity.4) Measured battery capacity and its degradation over mission life. Battery capacity degradation due to the mission charge/discharge cycles, calendar life aging, and any other factor contributing to capacity degradation.5) Battery capacity degradation rationales from life test data on the GOES R battery or similar battery with similar cells.6) Predicted battery capacity vs. nameplate capacity and justification rationale at the autumnal equinoxes at the following intervals over mission life:<ol style="list-style-type: none">i) Launchii) 2 years on-orbit storageiii) Beginning-of-life (BOL, 5 years on-orbit storage)iv) 10 years after launch (includes 5 years on-orbit storage and 5 years on-orbit operation)v) End-of-life (EOL, includes 5 years on-orbit storage and 10 years on-orbit operation)b) Battery depth-of-discharge (DOD) analyses for all mission modes, to include:<ol style="list-style-type: none">1) Battery DOD at launch, orbit-raising, on-orbit solstices (winter & summer), and on-orbit equinoxes.2) Performance of the battery nameplate capacity (C) with and without 1 cell failure for eclipses up to 72 minutes at the autumnal and vernal equinoxes.3) Battery DODs for any peak power operations or failure modes. Lunar eclipses following an equinox seasonal eclipse or any maneuvers requiring additional power from the battery. Failure to acquire the sun after a 72-minute eclipse and a worst-case sun acquisition to reacquire the sun.4) Rationale to support the calculated battery DODs including total spacecraft load during battery discharge, cell failures, average cell voltage during discharge, and battery temperature.

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL893	3.127.0-3	<ul style="list-style-type: none">c) Cell and Battery voltage charge/discharge profile over mission life, to include:<ul style="list-style-type: none">1) Prediction of voltage charge/discharge profiles during the equinoxes at the following intervals over mission life:<ul style="list-style-type: none">i) Launchii) 2 years on-orbit storageiii) Beginning-of-life (BOL, 5 years on-orbit storage)iv) 10 years after launch (includes 5 years on-orbit storage and 5 years on-orbit operation)v) End-of-life (EOL, includes 5 years on-orbit storage and 10 years on-orbit operation)2) Any on-orbit data or test data which provides rationale to support the predicted voltage charge/discharge profiles.3) Description of charging schemes and the charge rates utilized during eclipse seasons and solstice seasons over mission life. Rationale that includes on-orbit or life-cycle test data and supports these particular charging schemes and charge rates.4) Description of the charge efficiencies and their degradation for the predicted GOES R on-orbit charge/discharge cycle during equinox season eclipses over mission life. Rationale from on-orbit data or measured data that supports the charge efficiency profiles over mission life.5) Description & justification of the c/d ratio for the proposed on-orbit charge/discharge profiles during equinox season eclipses over mission life. On-orbit data or measured test data.6) Predictions of cell voltage charge/discharge profile for any lunar eclipses following an equinox seasonal eclipse or any peak power operations requiring battery power.7) Predictions of the battery charge/discharge voltage profile for any peak power operations requiring battery power. Load and the duration of discharge and the charge rate during recharge. Justification for charge rate and c/d ratio utilized for recharge with on-orbit data or test data.d) Battery thermal analysis that addresses all mission modes from launch to EOL, to include:<ul style="list-style-type: none">1) Description of the battery thermal design approach, to include: heat flow diagrams, cell dissipations, heater sizing, radiator sizing, thermal modeling approach, and discussion of heritage aspects of battery thermal design.2) Prediction of battery temperatures for launch, orbit-raising, initial outgas, on-orbit storage, and on-orbit operation (BOL & EOL) at the summer solstice, winter solstice, autumnal equinox, and vernal equinox. Include the predictions at the following mission milestones:<ul style="list-style-type: none">i) Launchii) 2 years on-orbit storageiii) Beginning-of-life (BOL) after 5 years on-orbit storageiv) 10 years on-orbit (5 years on-orbit storage and 5 years on-orbit operation)v) End-of-life (EOL) 15 years on-orbit (5 years on-orbit storage and 10 years on-orbit operation).3) Prediction of cell-to-cell temperature gradients within the battery-to-battery temperature gradients if there are multiple batteries. Justification for these predictions through analysis, test, or on-orbit data.

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL893	3.127.0-3	<ul style="list-style-type: none">e) Specific energy of the batteryf) Battery failure mode & effects analysis, to include:<ul style="list-style-type: none">1) Demonstration of the single fault tolerant design of the battery.2) Failures within the battery and their effects.3) Cells failing short or open and their effects.4) Overcharging of the battery cells.5) Overheating of the battery cells and battery.6) Cell voltage monitoring failures and their effects.7) Battery temperature or cell temperature sensor failures and their effects.8) By-pass diode failures and its effects.g) Battery reliability analysis for 5 years of ground storage, 5 years of on-orbit storage, and 10 years of on-orbit operation.h) Battery structural analysis, to include:<ul style="list-style-type: none">1) Battery chassis structural margins vs. launch loads2) Unit level vibration test levels and how they envelope the expected launch environment3) Fatigue analysis, including the number of times the battery can be removed from the spacecraft without replacement of hardware.i) Battery heritage analysis, to include:<ul style="list-style-type: none">1) Heritage geosynchronous orbit programs for GOES R series flight battery2) Number of successful on-orbit years for each heritage geosynchronous orbit GOES R series battery3) Number of cell failures for each heritage geosynchronous orbit GOES R series battery4) Heritage components of the GOES R series battery design and what programs are flying these aspects of the GOES R series battery design5) Number of successful on-orbit years for each heritage component of the GOES R series battery design6) Number of failures for each heritage component of the GOES R series battery designj) Summary of the battery design and cell design details with the following information:<ul style="list-style-type: none">1) Battery cell manufacturer2) Battery cell type3) Battery cell rated capacity/nameplate capacity at specific charge rate, discharge rate, temperature, and end-of-discharge voltage4) Expected measured battery cell capacity at specific charge rate, discharge rate, temperature, and end-of-discharge voltage5) Number of battery cells in series6) Number of battery cells in parallel7) Battery manufacturer8) Battery nameplate capacity at specific charge rate, discharge rate, temperature, and

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL893	3.127.0-3	end-of-discharge voltage 9) Battery cell by-pass circuitry 10) Battery cell voltage monitoring 11) Battery and cell temperature monitoring 12) Battery cell overcharge protection
SCCDRL894	3.128	3.128 Battery Cell Acceptance and Cell Qualification Test Plan
SCCDRL895	3.128.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> SC-POWR-07 2. <u>Title:</u> BATTERY CELL ACCEPTANCE AND CELL QUALIFICATION TEST PLAN 3. <u>Use:</u> To document the Battery Cell Acceptance and Cell Qualification Test Plan to assure sufficient test verification for the GOES R series flight cells. This DID provides the Battery Cell Acceptance and Cell Qualification Test Plan. It defines the test plan objectives, requirements verification, test equipment & test facility for performing the tests, tests and sequence of testing which will be performed, and the plan for data storage and archiving of the test data. 4. <u>Preparation Information:</u>
SCCDRL896	3.128.0-2	The Battery Cell Acceptance and Cell Qualification Test Plan shall: a) Define the objectives of the Battery Cell Acceptance and Cell Qualification Tests. b) Identify the battery cell requirements that will be verified through the implementation of the Battery Cell Acceptance and Cell Qualification Test Plan. c) Define the facility and test equipment that will be utilized to perform the battery cell acceptance and cell qualification testing. d) Define the following tests performed in the following sequence for battery cell qualification testing: 1) Cell mass measurement 2) Electrolyte leakage rate 3) Insulation resistance 4) 20 °C capacity test 5) 20 °C charge retention test (72 hr open circuit) 6) 0 °C capacity test 7) 10 °C capacity test 8) 30 °C capacity test 9) 40 °C capacity test 10) Insulation resistance 11) Electrolyte leakage

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL896	3.128.0-2	<ul style="list-style-type: none"> 12) Final visual inspection e) Define the following tests performed in the following sequence for the battery cell acceptance testing: <ul style="list-style-type: none"> 1) Cell mass measurement 2) Electrolyte leakage rate 3) Insulation resistance 4) 20 °C capacity test 5) 20 °C charge retention test (72 hr open circuit) 6) 10 °C capacity test 7) 30 °C capacity test 8) Insulation resistance 9) Electrolyte leakage 10) Final visual inspection f) Define the plan for recording and archiving the battery cell acceptance and cell qualification test data.
SCCDRL897	3.129	3.129 Battery Acceptance, Qualification, and Life Test Plan
SCCDRL898	3.129.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ul style="list-style-type: none"> 1. <u>CDRL No:</u> SC-POWR-08 2. <u>Title:</u> BATTERY ACCEPTANCE, QUALIFICATION, AND LIFE TEST PLAN 3. <u>Use:</u> To document the Battery Acceptance, Qualification, and Life Test Plan to assure sufficient test verification of the GOES-R series battery. <p>The Battery Acceptance, Qualification, and Life Test Plan defines the test plan objectives, requirements verification, test equipment & test facility for performing the tests, tests and sequence of testing which will be performed, and the plan for data storage and archiving of the test data.archiving of the test data.</p> 4. <u>Preparation Information:</u>
SCCDRL899	3.129.0-2	The initial Battery Acceptance, Qualification, and Life Test Plan shall contain the life test plans.
SCCDRL900	3.129.0-3	The subsequent Battery Acceptance, Qualification, and Life Test Plan shall contain the acceptance and qualification test plans.
SCCDRL901	3.129.0-4	<p>The Battery Acceptance, Qualification, and Life Test Plan shall:</p> <ul style="list-style-type: none"> a) Define the objectives of the GOES R series flight Battery Acceptance, Qualification, and Life Test Plan. b) Identify the battery requirements that will be verified through the implementation of the Battery Acceptance, Qualification, and Life Test Plan. c) Define the facility and test equipment that will be utilized to perform the battery acceptance, qualification, and life testing. d) Define the following tests performed in the following sequence for the battery qualification testing:

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SCCDRL901	3.129.0-4	<ol style="list-style-type: none">1) Functional testing<ol style="list-style-type: none">i) Electrolyte leakage rateii) Insulation resistanceiii) Temperature sensor check-outiv) 20 °C capacity testv) 20 °C charge retention test (72 hr open circuit)vi) Discharge pulse test2) Environmental testing with battery charged<ol style="list-style-type: none">i) Random vibration (battery charged)ii) Sine vibration (battery charged)iii) Sine burst test (battery charged)iv) 20 °C capacity testv) Discharge pulse testvi) Thermal-vacuum testing<ol style="list-style-type: none">(1) Minimum of 12 cycles, maximum of 15 cycles(2) Hot/cold plateau test in vacuum with a minimum of 4 electrical charge/discharge cycles and 3 consecutive stable cycles3) Battery capacity testing<ol style="list-style-type: none">i) 20 °C capacity testii) 0 °C capacity testiii) 10 °C capacity testiv) 30 °C capacity testv) 40 °C capacity test4) Repeat functional testing<ol style="list-style-type: none">i) Insulation resistanceii) Electrolyte leakageiii) Temperature sensor check-outiv) 20 °C charge retention test (72 hr open circuit)v) 20 °C capacity testvi) Discharge pulse test5) Physical measurements (e.g. mass, dimensions, volume)6) Final visual inspectione) Define the following tests performed in the following sequence for the battery acceptance testing:<ol style="list-style-type: none">1) Functional testing<ol style="list-style-type: none">i) Electrolyte leakage rateii) Insulation resistanceiii) Temperature sensor check-out

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL901	3.129.0-4	<ul style="list-style-type: none">iv) 20 °C capacity testv) 20 °C charge retention test (72 hr open circuit)vi) Discharge pulse test <p>2) Environmental testing with battery charged</p> <ul style="list-style-type: none">i) Random vibration (battery charged)ii) 20 °C capacity testiii) Thermal-vacuum testing<ul style="list-style-type: none">(1) Minimum of 12 cycles, maximum of 15 cycles(2) Hot/cold plateau test in vacuum with a minimum of 4 electrical charge/discharge cycles and 3 consecutive stable cycles <p>3) Battery capacity testing</p> <ul style="list-style-type: none">i) 20 °C capacity testii) 10 °C capacity testiii) 30 °C capacity test <p>4) Repeat functional testing</p> <ul style="list-style-type: none">i) Insulation resistanceii) Electrolyte leakageiii) Temperature sensor check-outiv) 20 °C charge retention test (72 hr open circuit)v) 20 °C capacity testvi) Discharge pulse test <p>5) Physical measurements (e.g. mass, dimensions, volume)</p> <p>6) Final visual inspection</p> <p>f) Define the following tests for the battery life testing:</p> <ul style="list-style-type: none">1) Mission life charge/discharge cycles testing2) Accelerated geosynchronous-earth-orbit (GEO) life testing <p>g) Define the plan for recording and archiving the battery acceptance, qualification, and life test data.</p>
SCCDRL902	3.130	3.130 Battery Handling, Storage, and Transportation Plan

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SCCDRL903	3.130.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-POWR-09 2. <u>Title:</u> BATTERY HANDLING, STORAGE, AND TRANSPORTATION PLAN 3. <u>Use:</u> The Battery Handling, Storage, and Transportation Plan provides the necessary plans and procedures for the GOES-R series battery handling, storage, packaging, transportation, installation, testing, maintenance, operation, and safety to ensure the GOES-R series battery remains compliant with its requirements. 4. <u>Preparation Information:</u>
SCCDRL904	3.130.0-2	The Battery Handling, Storage, and Transportation Plan shall include storage temperature, operating temperature, packaging, storage, state-of-charge, and other battery health and safety considerations.
SCCDRL905	3.131	<p>3.131 Solar Panel Qualification and Solar Panel and Array Acceptance Test Plan</p>
SCCDRL906	3.131.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-POWR-10 2. <u>Title:</u> SOLAR PANEL QUALIFICATION AND SOLAR PANEL AND ARRAY ACCEPTANCE TEST PLAN 3. <u>Use:</u> To document the Solar Panel Qualification and Solar Panel and Array Acceptance Test Plan to assure the solar panel(s) and array can meet or exceed the solar panel requirements. The Solar Panel Qualification and Solar Panel and Array Acceptance Test Plan defines the test plan objectives, requirements verification, test approach, test equipment & test facilities required, tests and sequence of testing that will be performed, pass/fail criteria for each test, and the test data storage and archiving plan. 4. <u>Preparation Information:</u>
SCCDRL907	3.131.0-2	The initial Solar Panel Qualification and Solar Panel and Array Acceptance Test Plan shall contain the qualification test plans.
SCCDRL908	3.131.0-3	The subsequent Solar Panel Qualification and Solar Panel and Array Acceptance Test Plan shall contain the acceptance test plans.
SCCDRL909	3.131.0-4	<p>The Solar Panel Qualification and Solar Panel and Array Acceptance Test Plan shall:</p> <ol style="list-style-type: none"> a) Define the objectives of the Solar Panel Qualification and Solar Panel and Array Acceptance Test Plan. b) Identify the solar array requirements that will be verified through the implementation of the Solar Panel Qualification and Solar Panel and Array Acceptance Test Plan. c) Define the approach to qualify and accept the solar panels and solar array. d) Identify the facility and test equipment that will be utilized to perform the solar panel qualification testing. e) Define the test flow, tests, and test sequence that will be performed for the solar panel qualification testing f) Define the pass/fail criteria for each of the functional and performance tests to be

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL909	3.131.0-4	<p>completed for the solar panel qualification life-cycle coupons.</p> <ul style="list-style-type: none"> g) Define the plan for recording and archiving the solar panel life-cycle coupon test data. h) Define the test flow, tests, and test sequence that will be performed for the flight solar panel acceptance testing. i) Define the test flow, tests, and test sequence for the Flight Panel(s) Environmental Testing. j) Define the test flow, tests, and test sequence for the Flight Panel(s) Post-Environmental Testing. k) Define the test flow, tests, and test sequence for the Spacecraft-Level Solar Array Testing. l) Define the test flow, tests, and test sequence for the flight solar array and flight solar panel after completing spacecraft-level environmental testing and mechanical deployments. m) Define the test flow, tests, and test sequence for the flight solar panel(s) and flight solar array for final integration in preparation for launch. n) Define the test flow, tests, and test sequence after storage of the flight solar panel(s) for periods that exceed 4 years. o) Define the pass/fail criteria for each of the functional and performance tests to be completed for the solar panel(s) and solar array. p) Define the test plan for verifying the solar absorptance for 12 flight solar cells. q) Define the plan for recording and archiving the flight solar panel and flight solar array test data
SCCDRL910	3.132	3.132 Software Management Plan
SCCDRL911	3.132.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-FLSW-01 2. <u>Title:</u> SOFTWARE MANAGEMENT PLAN 3. <u>Use:</u> To define the contractor's systematic approach to, and processes used in, the management, development, testing (verification, validation, and qualification), documentation, configuration management, and quality assurance of the Spacecraft Flight Software. 4. <u>Preparation Information:</u>
SCCDRL912	3.132.0-2	The Software Management Plan shall apply to all software developed by the contractor for the GOES-R Program, including any software used to conduct system testing.
SCCDRL913	3.132.0-3	<p>The Software Management Plan shall include:</p> <ul style="list-style-type: none"> a) A description of practices, tasks, and activities performed as a basis for contractor effort and schedule determination. b) A table indicating the criticality classification and justification for each CSCI, in accordance with the definitions for Class A, B, C, D, E, F, G and H software in Appendix B of NPR 7150.2. c) A table mapping applicable software processes and/or SMP sections to show compliance with the following NPR 7150.2 sections: 2.2, 2.3, 2.4, 3 (all), 4.1, 4.2, 4.3, 4.4.1, 4.4.2,

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SCCDRL913	3.132.0-3	<p>4.4.3, and 5. Include a justification for any areas where a gap exists.</p> <ul style="list-style-type: none"> d) A table containing a mapping of applicable SW Lifecycle Process activities/reviews/milestones to at least the CSCI level. e) The plans for acquiring software which will be an integral part of the spacecraft flight software. Include a description of all subcontractor management and monitoring. f) The definition of the software decomposition criteria. g) A description of the software development management organization, including the organization chart, and a description of how the software personnel structure is integrated into the overall spacecraft development organization. Include a functional description of the duties of the positions defined on the organization chart, and their relationship to the accomplishment of WBS tasks. h) A discussion of the peer review/inspection process of software work products. Include a discussion of how both the informal and formal software reviews fit into the software development lifecycle, the spacecraft design reviews, and spacecraft development lifecycle. Indicate NASA, DCMA, and contractor SQA participation in reviews where applicable. i) An identification of any deviations from the standard life cycle necessary to accommodate the integration of commercially acquired software. Specifically include justification for testing of COTS software to levels less than that of development software. j) An identification of any modifications to the standard software development lifecycle to accommodate the integration of existing or planned reuse software. k) A description of all selected software languages(s) along with the selection justification. l) A description of software protection against vandalism, viruses, unauthorized access, and disaster risks. m) The software lifecycle model, including a description of software integration and hardware/software integration processes, software delivery, and maintenance. Include a description of the methodologies used in performing software requirements analysis and interface control, and software design and implementation. Describe the techniques used to transition between the two methodologies. n) A Risk Management section describing the processes and methods by which technical, cost, and schedule risks will be identified, evaluated, and minimized. o) A Software Configuration Management Plan section describing the configuration management process for the software and its associated products. Clearly define the relationship between the software configuration management approach and that employed by the remainder of the project. The Software Configuration Management (SCM) Plan should include: <ul style="list-style-type: none"> 1) SCM Management Overview -Organization, responsibilities, and interfaces and relationships to software life cycle; 2) Software Configuration Management Activities: <ul style="list-style-type: none"> i) Configuration Identification ii) Configuration Control iii) Status Accounting iv) Configuration Audits and Reviews; 3) Schedule information, which establishes the sequence and coordination for the identified activities and for all events affecting the Plan's implementation. 4) Software Configuration Management Resources -tools, techniques, equipment,

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SCCDRL913	3.132.0-3	<p>personnel, and training.</p> <p>5) Software Release management and delivery.</p> <p>6) Maintenance information, which identifies the activities and responsibilities necessary to ensure continued planning during the life cycle of the project.</p> <p>p) An identification of the constraints to which the development process is subject (e.g. methodologies, resource limitation, hardware processors, external dependencies, reuse of existing software).</p> <p>q) A description of software build definition, build planning rationale, and methodology used.</p> <p>r) Provide an overall view of the software test program, detailing test philosophy objectives and rationale for all software testing and hardware/software integration activities planned for the program. Include a discussion of the approach for providing independent testing above the lowest code level (unit or CSU).</p> <p>s) A description of the software development system and software test bed facility required to develop, test, evaluate and demonstrate that the software is in compliance with specifications. Describe any software development effort necessary for the integration, operation or use of these systems.</p> <p>t) A discussion of software metrics collected and their use.</p> <p>u) A Software Reliability Plan which documents the activities to be undertaken to achieve the software reliability requirements, as well as describe the activities to be undertaken to demonstrate that the software reliability requirements have been verified.</p> <p>v) A description of the software safety program approach, which documents the activities to be undertaken to achieve the software safety requirements, as well as describe the activities to be undertaken to demonstrate that the software safety requirements have been verified.</p> <p>w) A Software Maintenance Plan which provides insight into the method, approach, responsibility, and processes to be followed for maintenance of software and its associated documentation. Describe the specific standards, methods, tools, actions, procedures, and responsibilities associated with the software maintenance.</p>
SCCDRL914	3.133	3.133 Software Assurance Plan
SCCDRL915	3.133.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <p>1. <u>CDRL No</u>: SC-FLSW-02</p> <p>2. <u>Title</u>: SOFTWARE ASSURANCE PLAN</p> <p>3. <u>Use</u>: Details the procedures, reviews, and audits required to accomplish software assurance.</p> <p>4. <u>Preparation Information</u>:</p>
SCCDRL916	3.133.0-2	<p>The Software Assurance Plans shall be written per NASA-STD-8739.8, NASA Software Assurance Standard.</p> <p>Contractor format is acceptable</p>
SCCDRL917	3.134	3.134 Software Requirements Specification

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SCCDRL918	3.134.0-1	DESCRIPTION OF REQUIRED DATA <ol style="list-style-type: none"><li>1. <u>CDRL No:</u> SC-FLSW-03<li>2. <u>Title:</u> SOFTWARE REQUIREMENTS SPECIFICATION<li>3. <u>Use:</u> The Software Requirements Specification details the software performance, interface, operational, and quality assurance requirements for each CSCI allocated down to the unit (or CSU) level.<li>4. <u>Preparation Information:</u>
SCCDRL919	3.134.0-2	A Software Requirements Specification shall be delivered for all Class B and C software.
SCCDRL920	3.134.0-3	The Software Requirements specification shall be delivered in a format that includes DOORS compatible linked interrelationships with all higher and lower level specifications.

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SCCDRL921	3.134.0-4	<p>The Software Requirements Specification shall contain:</p> <ol style="list-style-type: none"> a) System overview b) CSCI requirements (allocated/derived to the unit level) <ol style="list-style-type: none"> 1) Functional requirements 2) Required states and modes 3) External interface requirements 4) Internal interface requirements 5) Internal data requirements 6) Adaptation requirements 7) Safety requirements 8) Performance and timing requirements 9) Security and privacy requirements 10) Environment requirements 11) Computer resource requirements. <ol style="list-style-type: none"> i) Computer hardware resource utilization requirements ii) Computer software requirements iii) Computer communications requirements 12) Software quality characteristics 13) Design and implementation constraints 14) Personnel-related requirements 15) Training-related requirements 16) Logistics-related requirements 17) Packaging requirements 18) Precedence and criticality of requirements c) Verification/Qualification provisions d) Requirements traceability and verification data allocated down to the unit (CSU) level e) Requirements partitioning for phased delivery f) Testing requirements that drive software design decisions; e.g., special system level timing requirements/checkpoint restart.
SCCDRL922	3.135	3.135 Software Design Document
SCCDRL923	3.135.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-FLSW-04 2. <u>Title:</u> SOFTWARE DESIGN DOCUMENT 3. <u>Use:</u> Thoroughly describes CSCI-wide design decisions, the CSCI architectural design, and the detailed design needed to implement the software. 4. <u>Preparation Information:</u>

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SCCDRL924	3.135.0-2	A Software Design Document shall be delivered for all Class B and C software. Contractor Format is Acceptable
SCCDRL926	3.135.0-3	The Software Design Document shall include: <ul style="list-style-type: none"> a) CSCI-wide design decisions/trade decisions. b) CSCI architectural design. c) CSCI decomposition and interrelationship between components. <ul style="list-style-type: none"> 1) CSCI components: <ul style="list-style-type: none"> i.) Description of how the software item satisfies the software requirements, including algorithms, data structures, and functional decomposition. ii.) Software item input/output description. iii.) Static/architectural relationship of the software units. iv.) Concept of execution including data flow, control flow, and timing. v.) Requirements traceability. vi.) CSCI's planned utilization of computer hardware resources. 2) Rationale for software item design decisions/trade decisions including assumptions, limitations, safety and reliability related items/concerns or constraints in design documentation. 3) Interface design. d) CSCI Implementation Plan
SCCDRL927	3.136	3.136 Software Test Plan
SCCDRL928	3.136.0-1	DESCRIPTION OF REQUIRED DATA <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-FLSW-05 2. <u>Title:</u> SOFTWARE TEST PLAN 3. <u>Use:</u> Thoroughly describes the plans for software unit/component level testing, software integration testing, and software qualification testing. The plan describes the software test environment to be used for testing, identifies the tests to be performed, and provides schedules for environment, development, and test activities. The plan provides an overview of software testing, test schedules, and test management procedures. 4. <u>Preparation Information:</u>
SCCDRL929	3.136.0-2	A Software Test Plan shall be delivered for all Class B and C software. Contractor format acceptable.
SCCDRL930	3.136.0-3	The Software Test Plan shall include: <ul style="list-style-type: none"> a) Test levels. b) Test types (e.g., unit testing, software integration testing, end-to-end testing, Software Requirements Specification verification/acceptance/qualification testing, regression testing).

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SCCDRL930	3.136.0-3	<ul style="list-style-type: none"> c) Test classes. d) General test conditions. e) Test progression. f) Data recording, reduction, and analysis. g) Test coverage (breadth and depth) or other methods for ensuring sufficiency of testing. h) Planned tests, including items and their identifiers. i) Test milestones. j) Software Requirements Verification (traceability) Matrix <ul style="list-style-type: none"> 1) Document the flow-down of each requirement to the test case and test method used to verify compliance and the test results. k) Software Requirements Specification verification/qualification testing environment, site, personnel, and participating organizations.
SCCDRL117 4	3.136.0-4	The Software Requirements Verification (traceability) Matrix discussed in the Software Test Plan shall be incorporated in the overall Spacecraft Performance Verification Plan and its Performance Verification Matrix.
SCCDRL931	3.137	3.137 Software Test Procedures
SCCDRL932	3.137.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-FLSW-06 2. <u>Title:</u> SOFTWARE TEST PROCEDURES 3. <u>Use:</u> Describes the test preparations, test cases, and test procedures to be used to perform verification testing of a CSCI against the Software Requirements Specification. This document defines the detailed test procedures and test cases that will be used in executing software tests to demonstrate that all software requirements have been met 4. <u>Preparation Information:</u>
SCCDRL933	3.137.0-2	Software Test Procedures shall be delivered for all Class B and C software. Contractor format acceptable.
SCCDRL934	3.137.0-3	The Initial Version of the Software Test Procedures shall include preliminary descriptions for all tests to be used in formal verification testing, without the detailed instructions (steps).
SCCDRL935	3.137.0-4	The Final Version of the Software Test Procedures shall include complete test descriptions for all tests to be used in formal verification testing.
SCCDRL936	3.137.0-5	<p>The Software Test Procedures shall contain:</p> <ul style="list-style-type: none"> a) Test preparations, including hardware and software b) Definition of each test case c) Test descriptions, including: <ul style="list-style-type: none"> 1) Test identifier 2) System or CSCI requirements addressed by the test case.

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SCCDRL936	3.137.0-5	<ul style="list-style-type: none"> 3) Prerequisite conditions 4) Test input 5) Detailed instructions (steps) for conducting procedure 6) Expected test results, including criteria for evaluating results, and assumptions and constraints 7) Criteria for evaluating results d) Requirements traceability e) Identification of test configuration
SCCDRL937	3.138	3.138 Software Test Report
SCCDRL938	3.138.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ul style="list-style-type: none"> 1. <u>CDRL No:</u> SC-FLSW-07 2. <u>Title:</u> SOFTWARE TEST REPORT 3. <u>Use:</u> A record of the verification testing performed on a CSCI against the Software Requirements Specification. 4. <u>Preparation Information:</u>
SCCDRL939	3.138.0-2	<p>A Software Test Report shall be delivered for all Class B and C software.</p> <p>Contractor format acceptable.</p>
SCCDRL941	3.138.0-3	<p>The Preliminary Version of the Software Test Report shall address the results of CSCI Integration Testing and Formal Test Dry-Run.</p>
SCCDRL942	3.138.0-4	<p>The Final Version of the Software Test Report shall address the results of CSCI Formal Verification/Qualification Testing.</p>
SCCDRL943	3.138.0-5	<p>The Software Test Report shall include:</p> <ul style="list-style-type: none"> a) Overview of the test results. <ul style="list-style-type: none"> 1) Overall assessment of the software as demonstrated by the test results. 2) Remaining deficiencies, limitations, or constraints detected by testing. (e.g., including description of the impact on software and system performance, the impact a correction would have on software and system design, and recommendations for correcting the deficiency, limitation, or constraint). 3) Impact of test environment. b) Detailed test results. <ul style="list-style-type: none"> 1) Project-unique identifier of a test and test procedure(s). 2) Summary of test results (e.g., including requirements verified). 3) Problems encountered. 4) Deviations from test cases/procedures. c) Test log (Final Version Only). <ul style="list-style-type: none"> 1) Date(s), time(s), and location(s) of tests performed.

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SCCDRL943	3.138.0-5	2) Test environment, hardware, and software configurations used for each test. 3) Date and time of each test-related activity, the identity of the individual(s) who performed the activity, and the identities of witnesses, as applicable. d) Rationale for decisions.
SCCDRL944	3.139	3.139 Software Maintenance Manual
SCCDRL945	3.139.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> SC-FLSW-08 2. <u>Title:</u> SOFTWARE MAINTENANCE MANUAL 3. <u>Use:</u> To provide information to aid in analyzing, debugging, modifying, testing and loading the software. This includes a description of any support hardware, software and tools required to maintain the software. The Software Maintenance Manual is not intended to provide a description of the software nor is it intended to provide instruction in how to program. 4. <u>Preparation Information:</u>
SCCDRL946	3.139.0-2	Contractor format acceptable. The Software Maintenance Manual shall include the following information: a) Description of the target hardware b) Description of the operating system(s) used on the target hardware, including appropriate reference manuals. c) Description of the compilers and linkers needed to maintain the software, including appropriate reference manuals. d) Description of test tools needed to verify the software including appropriate reference manuals e) Description of support software such as COTS systems that are integrated into the system. f) Provide any technical details that are needed to modify or patch the software. g) Describe any patches that currently exist. This includes listings of the source code and the procedures to compile, link, test, and load the patch. h) Provide the procedures that are needed to build a new release of the software.
SCCDRL947	3.140	3.140 Software Preliminary Design Review (SWPDR) Data Package

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SCCDRL948	3.140.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-FLSW-09 2. <u>Title:</u> SOFTWARE PRELIMINARY DESIGN REVIEW (SWPDR) DATA PACKAGE 3. <u>Use:</u> Thoroughly describes the preliminary design, functional decomposition, and requirements traceability of Class B and C Software. Provides overall view of the software test program. 4. <u>Preparation Information:</u>
SCCDRL949	3.140.0-2	<p>The SWPDR Data Package shall address:</p> <ol style="list-style-type: none"> a) Agenda b) Status of any open action items generated at prior reviews c) Presentation material for the subject review d) Analyses and reports required at the review e) Software design documentation and supportive design material in compliance with the Software Management Plan and Configuration Management Plan (e.g. software Requirements Specifications, Software Design Documents, Software Engineering Analyses, Use Case Analyses) f) The architecture and design of the software, necessary to operate, test, and analyze the Spacecraft and its algorithms. This includes design specifications down to the CSC level. g) Interfaces between the Spacecraft Flight Software and the Instruments, for all spacecraft modes. Include discussion of test and verification methods for these interfaces. h) Software capability to provide all spacecraft operational modes i) Status of any Safety Critical Software Requirements j) Software required for data analyses utilizing the EGSE k) Software for supporting spacecraft verification, integration, monitoring of performance, as well as supporting evaluation of data acquired during S/C integration l) Providing and maintaining real-time and off-line software for spacecraft validation m) Resource utilization estimates for each CSCI n) Software Test Program; to include test philosophy objectives and rationale for all software testing and hardware/software integration activities planned for the program. o) Approach to Command & Telemetry structure p) Overview and status of GOES-R Class D, or E (non-flight) software efforts (e.g. EGSE software, FSDE Software, Emulator Software, and Test Software)
SCCDRL950	3.141	<p>3.141 Software Critical Design Review (SWCDR) Data Package</p>

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SCCDRL951	3.141.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-FLSW-10 2. <u>Title:</u> SOFTWARE CRITICAL DESIGN REVIEW (SWCDR) DATA PACKAGE 3. <u>Use:</u> Thoroughly describes flight software detailed design and demonstrates that the detailed design satisfies the software and interface requirements. Defines test cases and demonstrates traceability of test procedures to requirements. 4. <u>Preparation Information:</u>
SCCDRL952	3.141.0-2	<p>The SWCDR Data Package shall address:</p> <ol style="list-style-type: none"> a) Agenda b) Status of any open action items generated at prior reviews c) Presentation material for the subject review d) Analyses and reports required at the review e) Software design documentation and supportive design material. f) All documentation as called for by the Software Management Plan g) Updates of all items required for SWPDR h) Definition of the test procedures and test case, to include all interface tests. i) Final Software Requirements Specification allocated to the CSU level. j) Resource utilization estimates for each CSCI k) Description of the Command and Telemetry Format and Structure
SCCDRL953	3.142	3.142 Flight Software Test Readiness Review (SWTRR) Data Package
SCCDRL954	3.142.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-FLSW-11 2. <u>Title:</u> FLIGHT SOFTWARE TEST READINESS REVIEW (SWTRR) DATA PACKAGE 3. <u>Use:</u> Thoroughly describes the flight software development status and reviews test readiness prior to the start of formal verification testing. 4. <u>Preparation Information:</u>
SCCDRL955	3.142.0-2	<p>The SWTRR Data Package shall address:</p> <ol style="list-style-type: none"> a) Agenda b) Status of any open action items generated at prior reviews c) Presentation material 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 documentation as called for in the Software Management Plan

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SCCDRL955	3.142.0-2	<ul style="list-style-type: none"> g) Failure report summaries including status of action and rationale for closure h) As-built documentation summary i) Overview of integration test results j) Description of the formal testing to be performed k) Overview of dry-runs of formal test procedures <ul style="list-style-type: none"> 1) Overall assessment of the software as demonstrated by the test results 2) Remaining deficiencies, limitations, or constraints detected by testing 3) Impact of test environment
SCCDRL956	3.143	3.143 Software Qualification Review (SWQR) Data Package
SCCDRL957	3.143.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ul style="list-style-type: none"> 1. <u>CDRL No:</u> SC-FLSW-12 2. <u>Title:</u> SOFTWARE QUALIFICATION REVIEW (SWQR) DATA PACKAGE 3. <u>Use:</u> For review of all test data and designs for compliance against specification requirements, variances, and mission operations requirements. To ensure that all software loaded onto flight hardware is flight qualified. 4. <u>Preparation Information:</u>
SCCDRL958	3.143.0-2	An SWQR Data Package shall be delivered for all Class B and C Software.
SCCDRL959	3.143.0-3	<p>This SWQR Data Package shall address:</p> <ul style="list-style-type: none"> a) Agenda b) Responses to action items generated at prior reviews c) Presentation material 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) Overview of Formal Test Results <ul style="list-style-type: none"> 1) Overall assessment of the software as demonstrated by the test results 2) Remaining deficiencies, limitations, or constraints detected by testing, 3) Impact of test environment g) Results of the functional and interface tests h) Malfunctions and corrective actions Impact of test environment i) Reliability predictions j) Comparison of measured performance with requirements and discussion of the effect of any variance and waivers k) Mission operation constraints l) Safety requirements m) Interface concerns, problems and solutions

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SCCDRL959	3.143.0-3	<ul style="list-style-type: none"> n) Compatibility of instrument with observatory flight support equipment, ground support equipment and operational ground equipment o) Software Version Description
SCCDRL960	3.144	3.144 Software Release Delivery Package
SCCDRL961	3.144.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-FLSW-13 2. <u>Title:</u> SOFTWARE RELEASE DELIVERY PACKAGE 3. <u>Use:</u> A software delivery package is required with submittal of each formal software release of flight software, FSDE software and/or Spacecraft Flight software for GSFC acceptance. There are three items comprising the software delivery package. The first item is the delivery letter describing what is being delivered. The second item is the software on appropriate media. The third item is accompanying documentation. 4. <u>Preparation Information:</u>
SCCDRL962	3.144.0-2	A Software Release Delivery Package shall be submitted with each formal software release for GSFC review.
SCCDRL963	3.144.0-3	<p>The Software Release Delivery Package shall include the following information:</p> <ol style="list-style-type: none"> a) Software Delivery Letter, one page in length, which defines briefly what is being delivered, contains in its attachments the details of the delivery, and identifies a point of contact for resolution of questions/misunderstandings/problems involving the delivery. Attachments which support the delivery letter are described in items listed below: <ol style="list-style-type: none"> 1) Description of Delivery Contents -Identify the delivery in terms of subsystem, release number(s), configuration ID(s), media type(s) (tapes, diskettes, other) and number of copies. 2) Build Instructions -Provide instructions to be used in building the delivered software, including the version number of system or vendor-supplied software required to build the system. The supplier should provide evidence that these instructions have been executed prior to delivery and that the software has been built successfully using them (As Built Configuration). 3) Special Operating Instructions -Indicate any special instructions that test or operations personnel need to know in using the software. These may include, for example, the use of special simulators, changes to operational procedures, the addition of new files, file format changes, operating constraints/limitations, workaround resolutions to documented problems, operational software version numbers, and associated database version numbers. 4) List of Resolved Anomaly Reports and Change Requests. 5) List of Unresolved Anomaly Reports and Change Requests. 6) Copy of Resolved Anomaly Reports and Change Requests. 7) Copy of Unresolved Anomaly Reports and Change Requests. 8) Matrix of requirements addressed by this release (may be done by reference to mapping of requirements identified in requirements specification document). 9) Release History Summary Matrix. 10) Inventory of the Delivered Media -Produce the inventory from the media

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SCCDRL963	3.144.0-3	<p>themselves.</p> <p>11) List of Release Documentation, e.g. users guide procedures.</p> <p>b) Software Delivery Media. The software delivery will be delivered on media as agreed to by the contractor and the Government. The software product deliverable for each baseline Build includes, but is not limited to, the following:</p> <ol style="list-style-type: none"> 1) Source Code 2) Object Code 3) Data 4) Executable Image <p>c) Accompanying Documentation. Provide updated copies of the following:</p> <ol style="list-style-type: none"> 1) Software Version Description Document 2) Software Users Manual 3) Software Version Description Document 4) Software Design Document 5) Software Requirements Specification 6) Software Test Report 7) Software Maintenance Manual
SCCDRL964	3.145	3.145 Software Delivery & Operations Transition Plan
SCCDRL965	3.145.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-FLSW-14 2. <u>Title:</u> SOFTWARE DELIVERY & OPERATIONS TRANSITION PLAN 3. <u>Use:</u> To define the contractor's approach to preparing and delivering Class B and C software to the user's site(s). To define the contractor's approach for transitioning the operations of the software to the user. 4. <u>Preparation Information:</u>
SCCDRL966	3.145.0-2	<p>A Software Delivery and Operations Transition Plan shall be delivered for all Class B and C software.</p> <p>Contractor format acceptable.</p>
SCCDRL967	3.145.0-3	<p>The Software Delivery and Operations Transition Plan shall include the following:</p> <ol style="list-style-type: none"> a) A description of how the executable software for each user site, including any batch files, command files, data files, or other software files will be installed and operated on its target computer(s). b) A description of how the source files will be transition to user site, including any batch files, command files, data files, or other software files will be installed and operated on its target computer(s). c) A description of the documentation to be delivered with the software. This could include a Software Users Manual, Software Input/Output Manual, Software Maintenance Manual, Computer Operation Manual, or other support manuals. d) A description of what activities will be done when installing the software at the user

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SCCDRL967	3.145.0-3	<p>sites, to include the actual installation, checkout and any other activities that are required.</p> <p>e) A description of the training program needed for the transition of the software to the user.</p>
SCCDRL968	3.146	3.146 Software Architecture Document
SCCDRL969	3.146.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: SC-FLSW-15 2. <u>Title</u>: SOFTWARE ARCHITECTURE DOCUMENT 3. <u>Use</u>: This document will be used to provide a top-level, conceptual design for all Class B and C software (which may consist of one or more CSCIs, CSCs, or CSUs) including major external and internal interfaces and logical data scheme. In addition, the document should describe the rationale for the architecture. 4. <u>Preparation Information</u>:
SCCDRL970	3.146.0-2	<p>The Software Architecture document shall address all Class B and C software developed by the contractor for the GOES-R Program.</p> <p>Contractor format is acceptable.</p>
SCCDRL112 8	3.146.0-3	<p>The primary topics for the Software Architecture Document shall include:</p> <ol style="list-style-type: none"> a) Design Approach and Tradeoffs (If there are major design constraints imposed upon the software, identify and describe each of them.) b) Conceptual Architecture Description c) External Interface Concept d) Traceability to Requirements e) Partitioning for Incremental Development f) Characteristics of the potential physical and organizational environment for the software. g) The general flow of both execution control and data across external interfaces for the software, including hardware and networking considerations affecting software operation. h) Anticipated data rates, processor and performance requirements, flexibility and expandability of the software, and development dependencies. i) Description of the Computer Software Configuration items (CSCI). Present a further description of the Computer Software Components (CSC) if appropriate. j) Estimated lines of code, amount of modified and reused code, estimated processor utilization, complexity, and risk for each CSCI. Distinguish between software which execute in PROM, software that is copied from ROM to RAM for execution, and software that is only in volatile or non-volatile memory. k) When discussing software reuse, show its applicability by presenting the similarity of requirements between the reuse program and GOES-R. Distinguish between software design or code that is proven, and “future heritage.” For “future heritage” software, report on the development process, test experience, and change history.

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SCCDRL971	3.147	3.147 Maintenance, Test, and Operations Manual for the Flight Software Development Environment
SCCDRL972	3.147.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> SC-FLSW-16 <li>2. <u>Title:</u> MAINTENANCE, TEST, AND OPERATIONS MANUAL FOR THE FLIGHT SOFTWARE DEVELOPMENT ENVIRONMENT <li>3. <u>Use:</u> Provide information necessary to install, troubleshoot, and maintain the Flight Software Development Environment. <li>4. <u>Preparation Information:</u>
SCCDRL973	3.147.0-2	<p>Contractor format acceptable.</p> <p>The Maintenance, Test, and Operations Manual for the Flight Software Development Environment (FSDE) shall include the following:</p> <ol style="list-style-type: none"> <li>a) Detailed vendor and custom equipment description, including a list of parts/devices. <li>b) Configuration of the final design including a set of reduced electrical schematics and top assembly mechanical drawings supporting the design and function description <li>c) Installation procedures. <li>d) Hardware maintenance resources. <li>e) Operation procedures. <li>f) Corrective maintenance procedures. <li>g) Preventive maintenance procedures. <li>h) Troubleshooting guide and error message descriptions.
SCCDRL111 3	3.148	3.148 Field Programmable Gate Arrays (FPGA) Development Plan
SCCDRL975	3.148.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> SC-FLSW-17 <li>2. <u>Title:</u> FIELD PROGRAMMABLE GATE ARRAYS (FPGA) DEVELOPMENT PLAN <li>3. <u>Use:</u> To document the contractor's systematic approach to, and processes used in, the management, design, development, testing (verification, validation, and qualification), documentation, configuration management, and quality assurance of any Field Programmable Gate Arrays (FPGAs). <li>4. <u>Preparation Information:</u>
SCCDRL976	3.148.0-2	<p>The FPGA Development Plan shall apply to all FPGAs developed by the contractor for the GOES-R Program.</p> <p>Contractor format acceptable.</p>

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL1129	3.148.0-3	<p>The FPGA Development Plan shall include:</p> <ol style="list-style-type: none"> a) A description of practices, tasks, and activities performed as a basis for contractor effort and schedule determination. b) A discussion of how FPGA functional and timing requirements are derived, documented, and verified. c) A discussion of the selected FPGA part type(s), including selection justification. d) A discussion of any plans for acquiring FPGAs and/or firmware, including intellectual property code and cores. Include a description of all subcontractor/vendor selection, management and/or monitoring. e) A description of FPGA design, development and verification processes. Include a description of the processes and tools used for design capture (e.g. VHDL, Verilog, schematic), simulation, synthesis, and implementation (place & route). f) A discussion of how the internal FPGA (peer) reviews fit into the FPGA development process, the instrument design reviews, and instrument development lifecycle. Indicate Quality Assurance (QA) and government notification and participation in FPGA reviews, where applicable. g) A description of FPGA design guidelines, including guidelines for Logic Utilization by type (combinatorial, sequential, RAM), I/O Utilization and Timing Margins at various stages of development. h) A Configuration Management section describing the configuration management process for FPGAs and their associated items (e.g. HDL source files, simulation scripts and stimuli, CAD tool configurations, netlists). Clearly define the relationship between the FPGA configuration management approach and that employed by the remainder of the project. Included in this section: <ol style="list-style-type: none"> 1) Configuration Identification 2) Configuration Control 3) Configuration Audits and Reviews 4) FPGA Configuration Management tools and techniques i) A discussion of QA involvement/monitoring/oversight/audit of FPGA development processes and their associated artifacts. j) Provide an overall view of the FPGA test program, detailing validation/verification approach, test philosophy objectives, and rationale for all FPGA testing activities planned for the program.
SCCDRL977	3.149	3.149 Field Programmable Gate Arrays (FPGA) Design Data Package
SCCDRL978	3.149.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-FLSW-18 2. <u>Title:</u> FIELD PROGRAMMABLE GATE ARRAYS (FPGA) DESIGN DATA PACKAGE 3. <u>Use:</u> An FPGA Design Data Package is required for each FPGA design to allow independent Government review and assessment of contractor FPGA designs 4. <u>Preparation Information</u>
SCCDRL979	3.149.0-2	The FPGA Design Data Package shall be submitted for each FPGA developed by the contractor for the GOES-R Program.

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SCCDRL980	3.149.0-3	<p>The FPGA Design Data Package shall include:</p> <ol style="list-style-type: none"> a) Box, board & FPGA requirements, specifications and/or presentations relevant to the FPGA b) FPGA source code (VHDL or Verilog), schematics and/or state machines/tables, including any 3rd party intellectual property code and/or cores c) Synthesis files (constraints & reports (.srr)) d) Actel database file (.adb) or equivalent file(s) if not an Actel FPGA e) Simulation testbenches/scripts and coverage report f) FPGA Place and Route Reports g) Circuit Card Assembly (CCA) schematics (PDF and native format) h) CCA parts list i) CCA netlist j) CCA layout (PDF and native format) k) Signal integrity analysis results l) Timing analysis results (external inputs and outputs, internal domain(s), internal domain crossings)
SCCDRL981	3.150	<h3>3.150 Spacecraft Magnetic Control Plan for Magnetometer Performance Assurance</h3>
SCCDRL982	3.150.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-MAGN-01 2. <u>Title:</u> SPACECRAFT MAGNETIC CONTROL PLAN FOR MAGNETOMETER PERFORMANCE ASSURANCE 3. <u>Use:</u> To ensure that no spacecraft (or spacecraft appendage) steady or time-varying field interferes with the spacecraft-provided magnetometer instrument. Meeting all required specification levels, as defined in the magnetometer performance specification, to measure the Earth's ambient magnetic field. 4. <u>Preparation Information:</u>
SCCDRL983	3.150.0-2	<p>The Spacecraft Magnetic Control Plan for Magnetometer Performance Assurance shall identify and characterize all magnetic materials used in fabrication of spacecraft flight hardware, including those used in the magnetometer support structure.</p>
SCCDRL984	3.150.0-3	<p>The Spacecraft Magnetic Control Plan for Magnetometer Performance Assurance shall describe all spacecraft parts that move in the spacecraft frame of reference.</p>
SCCDRL985	3.150.0-4	<p>The Spacecraft Magnetic Control Plan for Magnetometer Performance Assurance shall state magnetic field corrections required for the magnetic signature of any spacecraft components such as magnetic torquer coils whose stray magnetic signature exceeds allowable limits.</p>
SCCDRL986	3.150.0-5	<p>The Spacecraft Magnetic Control Plan for Magnetometer Performance Assurance shall describe in detail the stray magnetic fields arising from current loops in the spacecraft subsystems, payload, GFP instruments, and the associated interconnection harnessing.</p>

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SCCDRL987	3.150.0-6	The Spacecraft Magnetic Control Plan for Magnetometer Performance Assurance shall quantify the impact of the stray magnetic fields arising from current loops in the spacecraft subsystems, payload, GFP instruments, and the associated interconnection harnessing, on the magnetometer sensor.
SCCDRL988	3.150.0-7	The Spacecraft Magnetic Control Plan for Magnetometer Performance Assurance shall tabulate estimated dipole moment, position and orientation and calculated field at the magnetometer sensor, for all spacecraft components known to possess significant magnetic material. This tabulation is derived from the spacecraft magnetic field model.
SCCDRL989	3.150.0-8	The Spacecraft Magnetic Control Plan for Magnetometer Performance Assurance shall quantify the impact of the stray magnetic fields arising from all elements of power generation and distribution, heaters, communications components, and subsystems whose status changes frequently, on the magnetometer sensor.
SCCDRL990	3.150.0-9	The Spacecraft Magnetic Control Plan for Magnetometer Performance Assurance shall describe the system level stray magnetic test that will be employed for the GOES-R program to demonstrate that each individual spacecraft module and the flight system as a whole comply with the specification on the stray magnetic field.
SCCDRL991	3.150.0-10	The Spacecraft Magnetic Control Plan for Magnetometer Performance Assurance shall allow permanent and soft magnetic materials only in the absence of documented non-magnetic alternatives.
SCCDRL992	3.151	3.151 Spacecraft Magnetic Field Model
SCCDRL993	3.151.0-1	DESCRIPTION OF REQUIRED DATA <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> SC-MAGN-02 <li>2. <u>Title:</u> SPACECRAFT MAGNETIC FIELD MODEL <li>3. <u>Use:</u> For predicting worst-case magnetic signature from the spacecraft body at the flight sensor assembly, as well as to estimate the worst-case spacecraft attitude perturbations caused by magnetic torque. <li>4. <u>Preparation Information:</u>
SCCDRL994	3.151.0-2	The Spacecraft Magnetic Field Model shall include dipole moment, position and orientation for all spacecraft subsystems known to possess magnetic material.
SCCDRL995	3.151.0-3	A correction scheme (algorithm) for the Spacecraft Magnetic Field Model shall be included and delivered for use by the NOAA Space Environment Center for use in real-time data processing to correct for any magnetic signature that exceeds magnetometer specification limits.
SCCDRL996	3.152	3.152 Magnetometer Calibration Data Book

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SCCDRL997	3.152.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> SC-MAGN-03 2. <u>Title:</u> MAGNETOMETER CALIBRATION DATA BOOK 3. <u>Use:</u> The Magnetometer Calibration Data Book is used to provide the instrument specific calibration data and spacecraft level calibration data necessary for full interpretation of the orbital vector magnetic field data to the required accuracy, and for the generation of NOAA data products. 4. <u>Preparation Information:</u>
SCCDRL998	3.152.0-2	The Magnetometer Calibration Data Book shall contain a generic section, with a spacecraft specific addendum for each individual spacecraft.
SCCDRL999	3.152.0-3	The generic section of the Magnetometer Calibration Data Book shall contain a functional description of the Magnetometer, including block diagrams, schematics, and logic diagrams. Include the format for all raw data channels available from each instrument, and all spacecraft data channels needed for instrument calibration and data reduction.
SCCDRL100 0	3.152.0-4	The generic section of the Magnetometer Calibration Data Book shall contain the analytical form of data processing algorithms for the Magnetometer, showing all use of ground and on-orbit calibration data required to convert raw data channels to data in engineering units meeting specified performance requirements. These algorithms include, but are not limited to, temperature corrections required and magnetic field corrections required for the magnetic signature of any spacecraft components whose stray magnetic signature may exceed allowable limits.
SCCDRL100 1	3.152.0-5	The generic section of the Magnetometer Calibration Data Book shall contain a tabulation of estimated dipole moment, position and orientation and calculated field at the magnetometer sensor, for all spacecraft components known to possess magnetic material. This tabulation is derived from the spacecraft magnetic field model.
SCCDRL100 2	3.152.0-6	The generic section of the Magnetometer Calibration Data Book shall contain the physical location of the Magnetometer and its orientation with respect to the spacecraft axes.
SCCDRL100 3	3.152.0-7	The Magnetometer Calibration Data Book addendum for each spacecraft shall provide a record of all pertinent instrument level test and calibration data, including all raw data from which graphs, curves, and calibration coefficients, that have been generated.
SCCDRL100 4	3.152.0-8	For the Magnetometer Calibration Data Book addendum for each spacecraft, in the magnetic coordinate system inherent to each sensor, the data shall include sensitivities in nanoTesla per count and zero offset in counts for each axis, together with any corrections for sensor or electronics temperature required to meet the system level accuracy specification.
SCCDRL100 5	3.152.0-9	The Magnetometer Calibration Data Book shall provide calibration coefficients for the critical instrument temperature sensors.
SCCDRL100 6	3.152.0-10	The Magnetometer Calibration Data Book shall include a vendor provided orthogonalization matrix to transform a vector in the sensor magnetic coordinates into an orthogonal system defined in the sensor geometry.
SCCDRL100 7	3.152.0-11	The Magnetometer Calibration Data Book shall include the matrix or series of matrices required to transform the magnetic field vector in the orthogonal sensor geometry into the spacecraft X,Y, Z coordinate frame.

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SCCDRL100 8	3.152.0-12	The Magnetometer Calibration Data Book shall include the single composite matrix required to transform a vector in the sensor magnetic coordinates into the spacecraft X, Y, Z coordinate frame.
SCCDRL100 9	3.152.0-13	The Magnetometer Calibration Data Book shall include the results of the Magnetic Dipole Test performed at the spacecraft level for each spacecraft.
SCCDRL101 0	3.152.0-14	The Magnetometer Calibration Data Book shall include the results of the Stray Magnetic Fields Test performed at the spacecraft level for each spacecraft.
SCCDRL101 1	3.153	3.153 Spacecraft Simulator Design Document
SCCDRL101 2	3.153.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> GS-01 2. <u>Title:</u> SPACECRAFT SIMULATOR DESIGN DOCUMENT 3. <u>Use:</u> To provide documentation that can be used to understand the design and operation of the Spacecraft Simulator. 4. <u>Preparation Information:</u>
SCCDRL101 3	3.153.0-2	The Spacecraft Simulator Design Document shall describe the detailed design of the spacecraft simulator, including all hardware, software, firmware, and commercial-off-the shelf (COTS) test equipment used in the simulator.
SCCDRL101 4	3.153.0-3	Distinctions in the Spacecraft Simulator Design Document shall be made between flight-like components, simulated components, and full-software simulations.
SCCDRL117 3	3.153.0-4	<p>The software portion of the Spacecraft Simulator Design Document shall include:</p> <ol style="list-style-type: none"> a) Simulator design decisions/trade decisions and rationale. b) Simulator architectural design. c) Simulator decomposition and interrelationship between components. <ol style="list-style-type: none"> 1) Simulator components: <ol style="list-style-type: none"> i) Description of how the software item satisfies the software requirements, including algorithms, data structures, and functional decomposition. ii) Software item input/output description. iii) Static/architectural relationship of the software units. iv) Concept of execution including data flow, control flow, and timing. v) Requirements traceability. vi) Planned utilization of computer hardware resources. 2) Interface design. d) Simulator Implementation Plan.
SCCDRL101 5	3.154	3.154 Spacecraft Simulator User's Operations and Maintenance Manual

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SCCDRL101 6	3.154.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> GS-02 2. <u>Title:</u> SPACECRAFT SIMULATOR USER'S OPERATIONS AND MAINTENANCE MANUAL 3. <u>Use:</u> Used by the government to setup, use, troubleshoot, repair, and modify the spacecraft simulator. 4. <u>Preparation Information:</u>
SCCDRL101 7	3.154.0-2	The Spacecraft Simulator User's Operations and Maintenance Manual may be delivered in multiple volumes.
SCCDRL101 8	3.154.0-3	The Spacecraft Simulator User's Operations and Maintenance Manual shall be delivered in electronic format.
SCCDRL101 9	3.154.0-4	The user data and operator data in the Simulator User's Operations and Maintenance Manual shall contain pull down help menus.
SCCDRL102 0	3.154.0-5	The maintenance data in the Spacecraft Simulator User's Operations and Maintenance Manual shall be password protected.
SCCDRL102 1	3.154.0-6	<p>The data required for the Spacecraft Simulator User's Operations and Maintenance Manual shall be divided into three main categories; user data, operator data and maintenance data, as detailed below:</p> <ol style="list-style-type: none"> a) <u>USER DATA</u> <ol style="list-style-type: none"> 1) Description of Capabilities -describes features, capacities, and limitations of the simulator and its displays 2) Normal configuration and use -step by step menu of exact steps needed to bootstrap the simulator, including error avoidance and recovery. 3) Saving Simulation Status -method by which user can suspend the simulation for future use. 4) Fast Forwarding -describe how to run simulator in other than real time. Discusses constraint on non-realtime simulations. 5) Test Modes -delineates all possible operational modes of the simulator. 6) Graphics interfaces -complete description of operation of all graphics available to the simulator b) <u>OPERATOR DATA</u> <ol style="list-style-type: none"> 1) Simulator Component Interfaces -describes each and every component within the simulator and shows how it interfaces to the ground system. 2) Modes of Operation -detailed description of all mode of operation of the simulator and the appropriate display pages. 3) Anomaly Modeling -describes the types of anomalies that can be simulated and the means of producing them. c) <u>MAINTENANCE DATA</u> <ol style="list-style-type: none"> 1) Requirements Specification -the complete specifications provided to the designers of the simulator. 2) Detailed Design Document -all documentation on the final design including system architecture, platform selection criteria, module connectivity, error-handling

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SCCDRL102 1	3.154.0-6	<p>capabilities, system expansion methodology, drawings (block diagrams), wiring/schematics, parts/sparing, and user interfaces.</p> <ol style="list-style-type: none"> 3) Hardware Design and Specification -all documentation used in the selection, fabrication, installation, and integration of the hardware components of the simulator. 4) Acceptance Test Plan, Procedures, and Reports -all documentation regarding acceptance of the simulator including results of all test performed, all procedures run against the simulator, and the final report accepting the simulator. 5) Version Description Document -precise report for each new build of the simulator describes each change to the simulator hardware or software, including reason for change request, date requested, and date released. 6) User documents to support all deliverable SDVE tools.
SCCDRL117 0	3.155	3.155 Spacecraft Simulator Training Documentation
SCCDRL117 1	3.155.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> GS-03 2. <u>Title:</u> SPACECRAFT SIMULATOR TRAINING DOCUMENTATION 3. <u>Use:</u> Used by the government to train personnel to setup, use, troubleshoot, repair, and modify the spacecraft simulator. 4. <u>Preparation Information:</u>
SCCDRL117 2	3.155.0-2	<p>The Spacecraft Simulator Training Documentation shall include:</p> <ol style="list-style-type: none"> a) Training Plan: <ol style="list-style-type: none"> 1) Training Resources 2) Training Course Structure b) Training Manuals <ol style="list-style-type: none"> 1) Training Course Structure 2) Training Schedule 3) System and Operations Overview
SCCDRL102 5	3.156	3.156 Integration and Test Plans
SCCDRL102 6	3.156.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> IT-01 2. <u>Title:</u> INTEGRATION & TEST PLANS 3. <u>Use:</u> The Integration and Test Plans provide a description of the GOES-R test program for the designated subsystem, Auxiliary Communications Services (payload), GFP instrument, and magnetometer. 4. <u>Preparation Information:</u>

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SCCDRL102 7	3.156.0-2	Unique Integration and Test Plans shall be developed for each spacecraft subsystem, payload complement, GFP instrument complement, and the magnetometer, providing a detailed description of their integration and test program, including for the End-to-End test program.
SCCDRL102 8	3.156.0-3	Each Integration and Test Plan shall cover the time period from the start of subsystem level testing, through the completion of satellite level testing at the Launch Site, including all Special Tests.
SCCDRL102 9	3.156.0-4	The Integration and Test Plans shall define and document the specific integration and test events, and verification methodologies (Test/Analysis/Inspection/Similarity) that collectively demonstrate that the hardware/software is in compliance with the applicable performance specifications and programmatic requirements.
SCCDRL103 0	3.156.0-5	Contractor Defined Format for the Integration and Test Plans.
SCCDRL103 1	3.156.0-6	CDRL IT-01 information shall be integrated into CDRL IT-02. CDRL IT-02 is the comprehensive document which defines the overall I&T Program for the GOES-R Space Segment.
SCCDRL103 2	3.156.0-7	<p>The Integration and Test Plans shall use the following, added to the end of IT-01-XXXX (defined below):</p> <ul style="list-style-type: none"> a) -MECH (for Mechanical) b) -THER (for Thermal) c) -GN&C (for Guidance, Navigation, and Control) d) -C&DH (for Command and Data Handling) e) -COMM (for Communications) f) -POWR (for Power) g) -PROP (for Propulsion) h) -MAGN (for Magnetometer) i) -PYLD (for Auxiliary Communications Services (Payload)) j) -INST (for GFP Instruments)
SCCDRL103 3	3.157	3.157 Satellite Integration & Test Plan
SCCDRL103 4	3.157.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> IT-02 2. <u>Title:</u> SATELLITE INTEGRATION & TEST PLAN 3. <u>Use:</u> The Satellite Integration and Test Plan is the comprehensive document which defines and documents the overall GOES-R I&T Program. This document provides the integration of all Integration and Test Plans (CDRL IT-01) information at an implementation level of detail. The Satellite Integration and Test Plan is developed to track the verification requirements that must be satisfied to ensure a successful Integration & Test program. The plan defines

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SCCDRL103 4	3.157.0-1	the overall I&T test flow, test matrices, any program specific test requirements and provides the basis of the verification program.
4. <u>Preparation Information:</u>		
SCCDRL115 8	3.157.0-2	The Satellite Integration and Test Plan should include a “Test Like You Fly (TLYF) - Fly Like You Test” approach.
SCCDRL116 6	3.157.0-3	The Satellite Integration and Test Plan shall include the GFP Instrument Contractor's operational, testing, and contingency procedures (as submitted by the GFP Instrument Contractors).
SCCDRL115 7	3.157.0-4	<p>The Satellite Integration and Test Plan shall include the following information:</p> <ol style="list-style-type: none"> a) Initial verification requirements and compliance from, but not limited to, the SCMAR, ICDs, SOW, F&PS. b) I&T Test Flow <ol style="list-style-type: none"> 1) Pre-Environmental 2) Environmental 3) Post-Environment c) I&T Test Matrix (Test Phase vs. Test Procedure) <ol style="list-style-type: none"> 1) Defines Comprehensive Performance Test (CPT) and Limited Performance Test (LPT) tests performed 2) Defines performance testing 3) Identifies where redundant strings are tested 4) Identifies where and when alignment measurements and surveys and deployment tests are performed d) Describes Test Phase entry/exit criteria e) Describes Test Readiness Review and Post Test Review Processes f) Describes Verification Requirement methods <ol style="list-style-type: none"> 1) Qualification, Proto-flight, Acceptance g) Identify any Life Test Plans h) Defines Test Objectives and Plan for the following: <ol style="list-style-type: none"> 1) ETE 2) Ground Compatibility 3) INR 4) EMI/EMC 5) Special Tests i) Describes ESD, EMI/EMC and Contamination Control Plans j) Describe the facility requirements including any program specific facility requirements k) Defines Performance Trending Parameters l) Initial Launch I&T Test Flow and Plan
SCCDRL111 4	3.158	3.158 Satellite Launch Site Integration Plan (LSIP)

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SCCDRL103 7	3.158.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> IT-03 2. <u>Title:</u> SATELLITE LAUNCH SITE INTEGRATION PLAN (LSIP) 3. <u>Use:</u> The LSIP details all planned activities required to perform Satellite Launch Base I&T through Satellite final pre-launch/countdown preparations. The LSIP identifies Satellite support requirements and provides the basis for transmittal of all GOES requirements to Eastern Range for their use in preparation of the Launch Site Support Plan, and supporting Launch Vehicle (LV) payload requirement documents. 4. <u>Preparation Information:</u>
SCCDRL103 8	3.158.0-2	The LSIP shall define and document the support activities that are necessary for pre-launch I&T activities and the technical aspects of launch operations.
SCCDRL103 9	3.158.0-3	The LSIP shall specify all launch base facilities utilized for Satellite I&T, support services, and materials. GFP facility utilization and support requirements should be identified as applicable.
SCCDRL104 0	3.158.0-4	The LSIP shall document compliance with all Eastern Range safety training, security, and Personal Reliability Program requirements.
SCCDRL104 2	3.158.0-5	<p>Contractor Defined Format.</p> <p>The LSIP shall include:</p> <ol style="list-style-type: none"> 1.0 General <ol style="list-style-type: none"> 1.1 Plan Organization 1.2 Plan Scope 1.3 Applicable documents [Include: Itemized Procedure List w/ Hazardous/Non-Haz. Designation] 1.4 Satellite Hazard System Summary 2.0 Launch Site Management <ol style="list-style-type: none"> 2.1 Organization 2.2 Payload Processing Facility / Control Room / Office : Assignments 2.3 Meetings 2.4 Schedule -Master Schedule 3.0 Pre-launch/Launch Test Operations Summary <ol style="list-style-type: none"> 3.1 Schedule -Daily/Shift Detailed Schedule 3.2 Layout of Equipment (EGSE/MGSE/Flight Hardware) <ol style="list-style-type: none"> 3.2.1 Test Flow Depiction -Identify staging transitions for subject hardware as a function of processing schedule events 3.3 Description of Events at Launch Site <ol style="list-style-type: none"> 3.3.1 Satellite Delivery/Receipt Operations 3.3.2 Standalone Payload Processing Facility Operations (Non-Hazardous / Hazardous)

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SCCDRL104 2	3.158.0-5	<ul style="list-style-type: none"> 3.3.2.1 SC Electrical I&T 3.3.2.2 SC Mechanical I&T 3.3.2.3 SC Propulsion I&T 3.3.2.4 Contamination Control Activities 3.3.2.5 GFP I&T 3.3.2.6 ETE Testing (As Applicable) 3.3.2.7 Launch Countdown Rehearsals (As Applicable) 3.3.2.8 Satellite Inspections and Closeouts 3.3.3 Integrated Payload Processing Facility Operations <ul style="list-style-type: none"> 3.3.3.1 Satellite Mate with LV Adapter 3.3.3.2 Satellite Post-Mate Testing 3.3.3.3 Satellite Encapsulation 3.3.3.4 Satellite Post-Encapsulation Testing 3.3.3.5 Encapsulated Satellite Transportation Operations 3.3.4 Launch Complex Operations <ul style="list-style-type: none"> 3.3.4.1 Satellite Preparations for Pad Operations 3.3.4.2 Post Mate Electrical Testing 3.3.4.3 Satellite Mechanical Activities (As applicable) 3.3.4.4 Satellite Closeout Activities (As applicable) 3.3.4.5 Satellite Launch Countdown Support 3.4 SC Launch Hold Criteria 3.5 SC Environmental Requirements <ul style="list-style-type: none"> 3.4.1 Payload Processing Facility Requirements (Include 10K Operations Identification) 3.4.2 Pad Transport Operations 3.4.3 Post-Mate Payload Fairing 4.0 Contingency Operations <ul style="list-style-type: none"> 4.1 Hurricane Contingency <ul style="list-style-type: none"> 4.1.1 Pre-Encapsulation 4.1.2 Post-Encapsulation 4.2 Lightning Strike Contingency 4.3 Propellant Offload Contingency 5.0 Personnel Training Requirements and Certifications 6.0 Security 7.0 Safety 8.0 Special Support Requirements <ul style="list-style-type: none"> 8.1 Communications (Voice/Video) 8.2 Command / Telemetry

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SCCDRL104 2	3.158.0-5	8.3 Contamination Control (e.g. Purge Support Requirements) 8.4 GSE Handling & Transport (e.g. ASO to Pad)
SCCDRL104 3	3.159	3.159 Satellite Launch Commit Criteria
SCCDRL104 4	3.159.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> IT-04 2. <u>Title:</u> SATELLITE LAUNCH COMMIT CRITERIA 3. <u>Use:</u> The Satellite Launch Commit Criteria is the governing list for determining when a launch delay must be called, and should be strictly enforced. 4. <u>Preparation Information:</u>
SCCDRL104 5	3.159.0-2	The Satellite Launch Commit Criteria (SLCC) shall document the criteria to be used to commit the GOES-R spacecraft for launch.
SCCDRL104 6	3.159.0-3	The SLCC shall include criteria for the spacecraft, GFP instruments, the satellite launch control center(s), launch critical GSE, and associated activities prior to liftoff.
SCCDRL104 7	3.159.0-4	One or more violations of SLCC abort limits are mandatory for a satellite launch abort. Non-SLCC Out of Spec readings that do not violate the abort criteria, can, at the discretion of the Mission Director, be a cause for a launch scrub.
SCCDRL104 8	3.159.0-5	The SLCC abort criteria for GOES shall include but is not limited to the following guidelines: a) Anything that could result in unacceptable risk to the long term health and safety of the satellite b) Anything that could result in significant loss of redundancy of major subsystems and/or instruments c) Anything that would result in either of the above items if current trending continued.
SCCDRL104 9	3.159.0-6	The SLCC satellite configuration for launch shall be monitored via real-time telemetry.
SCCDRL105 0	3.159.0-7	Each SLCC telemetry parameter shall be tabulated with its acceptable values, tolerances, trending patterns, and out-of-limits conditions which would require a resolution prior to launch.
SCCDRL105 1	3.160	3.160 Subsystem Level Test Procedures
SCCDRL105 2	3.160.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> IT-05 2. <u>Title:</u> SUBSYSTEM LEVEL TEST PROCEDURES 3. <u>Use:</u> The Test Procedure documents the step by step testing process, for the designated subsystem, performed to verify compliance with applicable performance specifications and programmatic requirements. 4. <u>Preparation Information:</u>

ID	Object Number	417-R-SCCDRL-0015, RM Version, GOES-R Flight Project Contract Data Requirements List (CDRL)
SCCDRL105 3	3.160.0-2	Approval and Review designation for all Subsystem Level Test Procedures will be specified by the government on a subsystem basis (including GFP) at CDR + 30 days.
SCCDRL113 8	3.160.0-3	Subsystem Level Test Procedures shall also be developed in support of the ETE test program, as a means for establishing the test configuration required by the applicable ETE test. Contractor Defined Format.
SCCDRL105 4	3.160.0-4	As a minimum, the Subsystem Level Test Procedures shall contain the following information: <ul style="list-style-type: none"> a) Test Objectives b) Test Methods c) Applicable Documents and Software d) Required Spacecraft Configuration e) Test Equipment Configuration f) Test Equipment Identification g) Test Instrumentation h) Safety Provisions and Cautions i) Program Quality Requirements j) Detailed Test Instructions k) Data Recording Requirements l) Data Recording Forms and Tables m) Accept/Reject Criteria per Documented Test Requirement
SCCDRL105 5	3.161	3.161 Bus/Spacecraft Level Test Procedures
SCCDRL105 6	3.161.0-1	DESCRIPTION OF REQUIRED DATA <ol style="list-style-type: none"> 1. <u>CDRL No:</u> IT-06 2. <u>Title:</u> BUS/SPACECRAFT LEVEL TEST PROCEDURES 3. <u>Use:</u> The Test Procedure documents the step by step testing process, for the bus and spacecraft, performed to verify compliance with applicable performance specifications and programmatic requirements. 4. <u>Preparation Information:</u>
SCCDRL105 7	3.161.0-2	Approval and Review designation for Bus/Spacecraft Level Test Procedures will be specified by the government on a subsystem basis (including GFP) at CDR + 30 days.
SCCDRL113 9	3.161.0-3	Bus/Spacecraft Level Test Procedures shall also be developed in support of the ETE test program, as a means for establishing the test configuration required by the applicable ETE test. Contractor Defined Format.
SCCDRL105 8	3.161.0-4	As a minimum, the Bus/Spacecraft Level Test Procedures shall contain the following information: <ul style="list-style-type: none"> a) Test Objectives b) Test Methods

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SCCDRL105 8	3.161.0-4	<ul style="list-style-type: none"> c) Applicable Documents and Software d) Required Spacecraft Configuration e) Test Equipment Configuration f) Test Equipment Identification g) Test Instrumentation h) Safety Provisions and Cautions i) Program Quality Requirements j) Detailed Test Instructions k) Data Recording Requirements l) Data Recording Forms and Tables m) Accept/Reject Criteria per Documented Test Requirement
SCCDRL105 9	3.162	3.162 Satellite Level Test Procedures
SCCDRL106 0	3.162.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> <li>1. <u>CDRL No:</u> IT-07 <li>2. <u>Title:</u> SATELLITE LEVEL TEST PROCEDURES <li>3. <u>Use:</u> The Test Procedure documents the step by step testing process, for the designated subsystem, performed to verify compliance with applicable performance specifications and programmatic requirements. <li>4. <u>Preparation Information:</u>
SCCDRL106 1	3.162.0-2	Approval and Review designation for Satellite Level Test Procedures will be specified by the government on a subsystem basis (including GFP) at CDR + 30 days.
SCCDRL114 0	3.162.0-3	<p>Satellite Level Test Procedures shall also be developed in support of the ETE test program, as a means for establishing the test configuration required by the applicable ETE test.</p> <p>Contractor Defined Format.</p>
SCCDRL106 2	3.162.0-4	<p>As a minimum, the Satellite Level Test Procedures shall contain the following information:</p> <ul style="list-style-type: none"> <li>a) Test Objectives <li>b) Test Methods <li>c) Applicable Documents and Software <li>d) Required Spacecraft Configuration <li>e) Test Equipment Configuration <li>f) Test Equipment Identification <li>g) Test Instrumentation <li>h) Safety Provisions and Cautions <li>i) Program Quality Requirements <li>j) Detailed Test Instructions

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SCCDRL106 2	3.162.0-4	<ul style="list-style-type: none"> k) Data Recording Requirements l) Data Recording Forms and Tables m) Accept/Reject Criteria per Documented Test Requirement
SCCDRL106 3	3.163	3.163 Subsystem Level Post-Test Data Package
SCCDRL106 4	3.163.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> IT-08 2. <u>Title:</u> SUBSYSTEM LEVEL POST-TEST DATA PACKAGE 3. <u>Use:</u> The Post-Test Data Package provides a comprehensive record which documents/summarizes the results of the as-run test procedure. The Post-Test Data Package identifies which test objectives were accomplished, how well predicted performance was validated by the test data, and annotates any other significant events which occur during testing. 4. <u>Preparation Information:</u>
SCCDRL106 5	3.163.0-2	<p>The Subsystem Level Post-Test Data Package shall include an evaluation of the data taken during subsystem integration and test for conformance with applicable subsystem performance specifications and programmatic requirements.</p> <p>Contractor Defined Format.</p>
SCCDRL106 6	3.163.0-3	<p>As a minimum, the Subsystem Level Post-Test Data Package shall contain the following information:</p> <ul style="list-style-type: none"> a) Copy of As Run Test Procedure b) Evidence of Quality Assurance acceptance data c) Listing of test requirements verified d) Summary description and commentary on the test data package e) Test procedure change record listing f) Data trending g) Material review actions resulting from the tests h) Test equipment calibration data (Not required for routine test equipment calibrations) i) Anomaly report listing and copies (Including status/resolution if completed by submittal) j) Unit Failure Free / Limited Life Time Accounting
SCCDRL106 7	3.164	3.164 Bus/Spacecraft Level Post-Test Data Package
SCCDRL106 8	3.164.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> IT-09 2. <u>Title:</u> BUS/SPACECRAFT LEVEL POST-TEST DATA PACKAGE 3. <u>Use:</u> The Post-Test Data Package provides a comprehensive record which

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SCCDRL106 8	3.164.0-1	documents/summarizes the results of the as-run test procedure. The Post-Test Data Package identifies which test objectives were accomplished, how well predicted performance was validated by the test data, and annotates any other significant events which occur during testing.
4. <u>Preparation Information:</u>		
SCCDRL106 9	3.164.0-2	The Bus/Spacecraft Level Post-Test Data Package shall include an evaluation of the data taken during bus and spacecraft integration and test for conformance with applicable bus and spacecraft performance specifications and programmatic requirements.
Contractor Defined Format.		
SCCDRL107 0	3.164.0-3	As a minimum, the Bus/Spacecraft Level Post-Test Data Package shall contain the following information:
<ul style="list-style-type: none"> a) Copy of As Run Test Procedure b) Evidence of Quality Assurance acceptance data c) Listing of test requirements verified d) Summary description and commentary on the test data package e) Test procedure change record listing f) Data trending g) Material review actions resulting from the tests h) Test equipment calibration data (Not required for routine test equipment calibrations) i) Anomaly report listing and copies (Including status/resolution if completed by submittal) j) Unit Failure Free / Limited Life Time Accounting 		
SCCDRL107 1	3.165	3.165 Satellite Level Post-Test Data Package
SCCDRL107 2	3.165.0-1	DESCRIPTION OF REQUIRED DATA
<ol style="list-style-type: none"> 1. <u>CDRL No:</u> IT-10 2. <u>Title:</u> SATELLITE LEVEL POST-TEST DATA PACKAGE 3. <u>Use:</u> The Post-Test Data Package provides a comprehensive record which documents/summarizes the results of the as-run test procedure. The Post-Test Data Package identifies which test objectives were accomplished, how well predicted performance was validated by the test data, and annotates any other significant events which occur during testing. 		
4. <u>Preparation Information:</u>		
SCCDRL107 3	3.165.0-2	The Satellite Level Post-Test Data Package shall include an evaluation of the data taken during satellite integration and test for conformance with applicable satellite performance specifications and programmatic requirements.
Contractor Defined Format.		

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SCCDRL107 4	3.165.0-3	<p>As a minimum, the Satellite Level Post-Test Data Package shall contain the following information:</p> <ol style="list-style-type: none"> a) Copy of As Run Test Procedure b) Evidence of Quality Assurance acceptance data c) Listing of test requirements verified d) Summary description and commentary on the test data package e) Test procedure change record listing f) Data trending g) Material review actions resulting from the tests h) Test equipment calibration data (Not required for routine test equipment calibrations) i) Anomaly report listing and copies (Including status/resolution if completed by submittal) j) Unit Failure Free / Limited Life Time Accounting
SCCDRL107 5	3.166	3.166 Transportation and Handling Plan & Procedures
SCCDRL107 6	3.166.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> IT-11 2. <u>Title:</u> TRANSPORTATION AND HANDLING PLAN & PROCEDURES 3. <u>Use:</u> The Transportation and Handling Plan and Procedures define and document the process for handling and transporting the Satellite, GSE, and flight spares during integration and test activity, through transportation to the Eastern Range (ER) for Launch Base Processing. 4. <u>Preparation Information:</u>
SCCDRL107 7	3.166.0-2	The Transportation and Handling Plan shall incorporate details of the satellite and GSE during the integration and test flow sequence and the transportation from the contractor's plant to the ER.
SCCDRL107 8	3.166.0-3	The Transportation and Handling Plan shall specify requirements for air or ground shipment.
SCCDRL107 9	3.166.0-4	<p>The Transportation and Handling Plan shall include all necessary planning and paperwork for shipping to support the transportation.</p> <p>Contractor Defined Format.</p>

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SCCDRL108 0	3.166.0-5	<p>The Transportation and Handling Plan shall include the following, but not be limited to:</p> <ol style="list-style-type: none"> a) Ground and/or air shipment cargo loading and unloading procedures. b) Cargo manifest including aircraft layout diagrams. c) Staging area plans and diagrams. d) Trip planning schedule of events, required support, route, contingency plans, permits. e) Loading/unloading GSE and personnel required. f) Requirements for calibration, special tools, fixtures, shipping containers. g) Transportation and handling flow plan for the spacecraft during manufacture, integration, test, and launch activity.
SCCDRL108 1	3.166.0-6	<p>The Transportation & Handling Procedures shall specify all of the step-by-step procedures for the handling and transporting of the Satellite, GSE, and flight spares.</p>
SCCDRL108 2	3.166.0-7	<p>The Transportation & Handling Procedures shall include, but not be limited to:</p> <ol style="list-style-type: none"> a) Special environmental conditions, such as cleanliness, temperature, humidity. b) Format for recording QA stamp, deviations, and approval columns. c) Requirements for special tools, equipment, special handling fixtures, and containers. d) Procedures to comply with local, state, and federal safety requirements. e) Procedures for maintaining contact with the transported item (where applicable). f) A log of events and periodic environmental readings throughout all transportations. g) A discrepancy report of all unexpected events evaluated for their possible negative impact on the spacecraft.
SCCDRL108 3	3.167	<h3>3.167 Ground Storage Plan</h3>
SCCDRL108 4	3.167.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> IT-12 2. <u>Title:</u> GROUND STORAGE PLAN 3. <u>Use:</u> This document provides the plan for implementing ground storage of the GOES-R Satellite. 4. <u>Preparation Information:</u>
SCCDRL108 5	3.167.0-2	<p>The Ground Storage Plan shall describe the following:</p> <ol style="list-style-type: none"> a) The stage in the satellite acceptance test flow sequence at which the satellite would be placed into ground storage. b) Satellite ground storage configuration, including which components (if any) would be removed for separate storage. c) Ground storage containers and environment and the associated instrumentation for monitoring the satellite and environment during storage. d) The schedule and extent of satellite testing and inspection during ground storage. An annual test of selected spacecraft and instruments is required.

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SCCDRL108 5	3.167.0-2	<ul style="list-style-type: none"> e) Flight battery certification plan with the effects of the storage period on the expected in-orbit lifetime. f) Impact of prolonged storage on satellite operational lifetime including expendables. g) Removal from storage, including retesting requirements. h) A plan for maintaining the readiness of the system test equipment, and Ground Support Equipment. i) The management plan for insuring availability of facilities and experienced personnel to support the storage and post-storage activities, including but not limited to training in the following areas: <ul style="list-style-type: none"> 1) Instrument Test and STE operation 2) Assembly, Integration and Test Personnel for GOES specific support 3) Spacecraft System Post-Storage Integration and Test 4) Spacecraft Thermal Vacuum (SCTV) Test 5) End To End Test j) The procedures and documentation plan for handling discrepancies and malfunctions found prior to and during the storage period. k) The call-up and activation plan and schedule with milestones and event span-times that will be followed after receipt of direction to remove the satellite from storage to meet a selected launch date. l) The storage and test requirements for the GFP instruments.
SCCDRL108 6	3.168	3.168 GFP Instrument Safe-To-Mate Test Plan
SCCDRL108 7	3.168.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> IT-13 2. <u>Title:</u> GFP Instrument Safe-To-Mate Test Plan 3. <u>Use:</u> The GFP Instrument Safe-To-Mate Test Plan provides the implementation details required for the successful electrical integration of the GFP instruments on the spacecraft. The plan defines the test procedures required for the GFP/spacecraft interface signal characterization test (first spacecraft only) and interface signal Safe-To-Mate test (all spacecraft). 4. <u>Preparation Information:</u>
SCCDRL108 8	3.168.0-2	<p>Contractor Defined Format</p> <p>The GFP Safe-To-Mate Test Plan shall include the following information:</p> <ul style="list-style-type: none"> a) Provides verification requirements and compliance from the SCMAR, GFP to Spacecraft ICDs, SOW, and F&PS b) Verification that all the spacecraft/GFP interface signals (primary and redundant) are safe-to-mate tested for voltage, isolation and grounding. The resulting test procedure will be used on all spacecraft. c) Description of the method and the test equipment required to characterize the Spacewire GFP/spacecraft interface signals. The parameters of these interface signals to be characterized will be determined through agreement between the government, the

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SCCDRL108 8	3.168.0-2	<p>spacecraft contractor, and the instrument provider. The resulting test procedure will apply only to the first spacecraft.</p> <p>d) Test procedures will be developed by the spacecraft contractor in collaboration with GFP contractors and government personnel.</p> <p>e) Test Readiness Review and Post Test Review Processes</p> <p>f) Describe the facility requirements for the tests (e.g. clean room, specific GFP handling).</p>
SCCDRL108 9	3.169	<h3>3.169 Satellite/Launch Vehicle Interface Requirements Document (IRD)</h3>
SCCDRL109 0	3.169.0-1	<h4>DESCRIPTION OF REQUIRED DATA</h4> <ol style="list-style-type: none"> 1. <u>CDRL No</u>: LO-01 2. <u>Title</u>: SATELLITE/LAUNCH VEHICLE INTERFACE REQUIREMENTS DOCUMENT (IRD) 3. <u>Use</u>: The Satellite to Launch Vehicle Interface Requirements Document (IRD) is designed to provide the satellite requirements definition, interface details, launch site facilities, and safety data necessary to interface with the launch vehicle. It defines the mission requirements and interfaces as they are known. It should also include any other government furnished hardware and services required such as transportation, propellants or analytical support services, facility utilization, as applicable. 4. <u>Preparation Information</u>:
SCCDRL109 1	3.169.0-2	The Satellite/Launch Vehicle Interface Requirements Document (IRD) shall document all mission-peculiar requirements.
SCCDRL115 9	3.169.0-3	Satellite IRD inputs will form the basis for the development of the Satellite/LV ICD.
SCCDRL109 2	3.169.0-4	<p>The format for Satellite/Launch Vehicle IRD shall be as follows:</p> <ol style="list-style-type: none"> 1 INTRODUCTION & SCOPE (Includes mission and S/C description) 2 APPLICABLE DOCUMENTS 3 INTERFACE REQUIREMENTS <ol style="list-style-type: none"> 3.1 MECHANICAL INTERFACES <ol style="list-style-type: none"> 3.1.1 Structural Interfaces <ol style="list-style-type: none"> 3.1.1.1 Coordinate Systems 3.1.1.2 LV Payload Static Envelope 3.1.1.3 Hardware Clearances 3.1.1.4 Separation System Clearances 3.1.1.5 S/C Access Requirements 3.1.1.6 S/C Purge Interface 3.1.2 Structural Loads <ol style="list-style-type: none"> 3.1.2.1 Stiffness (S/C Frequency)

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SCCDRL109 2	3.169.0-4	3.1.2.2	Interface Load Factors
		3.1.2.3	Interface Loads
		3.1.2.4	Strength
		3.1.3	Mass Properties
		3.1.3.1	S/C Mass Properties
		3.1.3.2	S/C Propellant Data (i.e. for slosh analysis)
		3.2	ELECTRICAL INTERFACES
		3.2.1	Airborne Interfaces
		3.2.1.1	Electrical Connectors
		3.2.1.2	Electrical Interface Constraints (Separation Deadfacing)
		3.2.1.3	Separation Verification
		3.2.1.4	Telemetry Interfaces
		3.2.1.5	Instrumentation & Instrumentation Telemetry Requirements
		3.2.1.6	RF Link Interfaces
		3.2.1.7	Discrete Command Interfaces
		3.2.1.8	Airborne Power Interfaces
		3.2.2	GSE Interfaces
		3.2.2.1	Umbilical Interfaces
		3.2.2.2	GSE Electrical Interface Constraints (Liftoff Deadfacing)
		3.2.3	Telemetry/Command/Data Interfaces
		3.2.4	Grounding
		3.2.4.1	S/C Grounding
		3.2.4.2	Support Equipment & GSE Grounding
		3.2.4.3	Personnel Grounding
		3.2.4.4	Grounding Continuity
		3.3	ENVIRONMENTAL INTERFACES
		3.3.1	Thermal Interfaces
		3.3.1.1	Ground Transport Temperature & Humidity
		3.3.1.2	Launch Pad A/C Temp, Humidity & Flow Rate
		3.3.1.3	Flight Payload Fairing Temperatures
		3.3.1.4	PLF Jettison Free Molecular Heating & Dynamic Pressure
		3.3.1.5	Parking Orbit Free Molecular Heating
		3.3.2	Contamination
		3.3.2.1	Contamination Sensitive Surfaces
		3.3.2.2	Deposition & Non-volatile Residue Requirements
		3.3.2.3	LV Hardware Cleaning
		3.3.2.4	LV Materials Control
		3.3.2.5	S/C Transport Purges

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SCCDRL109 2	3.169.0-4	3.3.2.6	S/C Launch Pad Purges
		3.3.2.7	LV Debris
		3.3.2.8	Helium Sensitivity
		3.3.3	Pressure
		3.3.3.1	Pressure Profile
		3.3.3.2	Pressure Decay Rate
		3.3.3.3	A/C Impingement Velocities
		3.3.4	Dynamic Environments
		3.3.4.1	Acoustics
		3.3.4.2	Vibration
		3.3.4.3	Shock
		3.3.5	Electromagnetic Compatibility
		3.3.5.1	EMI Safety Margin
		3.3.5.2	Radiated Emissions Compatibility/Susceptibility (S/C, LV & Range RF Sources)
		3.3.5.3	Lightning Protection
		3.3.5.4	Interface Electrical Bonding
		3.4	FLIGHT DESIGN INTERFACES
		3.4.1	Launch Vehicle Performance
		3.4.2	Parking Orbit (Perigee Altitude, Thermal Roll Requirements)
		3.4.3	Transfer Orbit (Perigee Altitude, Injection Accuracy)
		3.4.4	Launch Period/Windows
		3.4.5	Sequence Requirements (S/C Events During Launch Sequence)
		3.4.6	Separation Requirements (Attitude, Spin Rates, Angular Rates, Separation Velocity, LV Attitude Control Inhibit)
		3.4.7	Post Separation Requirements (CCAM, Attitude Control Inhibits)
		3.5	FLIGHT OPERATIONS INTERFACES
		3.5.1	Telemetry & Tracking
		3.5.2	Acquisition Assistance (Orbital Parameter Message, State Vectors)
		3.6	GROUND OPERATIONS
		3.6.1	Facility Requirements (PPF/HPF, Blockhouse/LCC, Launch Pad)
		3.6.2	Transport Requirements
		3.6.3	Environmental Control/Purges
		3.6.4	Communications
		3.6.5	Propellants, Fluids & Gases
		3.7	SAFETY REQUIREMENT
		3.7.1	Safety Design Requirements
		3.7.2	Hazardous Systems/Elements

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SCCDRL109 2	3.169.0-4	3.7.3 Hazardous Operations
SCCDRL109 3	3.170	3.170 Satellite Mission Insignia
SCCDRL109 4	3.170.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> LO-02 2. <u>Title:</u> SATELLITE MISSION INSIGNIA 3. <u>Use:</u> For application to the Launch Vehicle for each GOES-R launch. 4. <u>Preparation Information:</u>
SCCDRL109 5	3.170.0-2	For the Satellite Mission Insignia dimensional information regarding the available footprint for this application, as well as the application location on the Launch Vehicle, in LV coordinates in the Satellite/Launch Vehicle ICD shall be provided.
SCCDRL109 6	3.170.0-3	The Satellite Mission Insignia shall be a joint development effort between the Government and Spacecraft Contractor.
SCCDRL109 7	3.170.0-4	The Satellite Mission Insignia submittal shall provide a color rendition of the Mission Insignia, which will be scaled by the Launch Vehicle contractor to occupy the largest available area designated for this application.
SCCDRL109 8	3.170.0-5	Definition of the Satellite Mission Insignia will be required by the Satellite /Launch Vehicle ICD.
SCCDRL109 9	3.171	3.171 Satellite Training Program Plan
SCCDRL110 0	3.171.0-1	DESCRIPTION OF REQUIRED DATA 1. <u>CDRL No:</u> LO-03 2. <u>Title:</u> SATELLITE TRAINING PROGRAM PLAN 3. <u>Use:</u> The Satellite Training Program Plan defines and describes training required to provide engineering and operational knowledge of the GOES-R series satellite throughout all mission phases (launch through end-of-life) 4. <u>Preparation Information:</u>
SCCDRL110 1	3.171.0-2	The Satellite Training Program Plan shall identify the training approach, resources required, training material deliveries, and schedules for engineering and operational training for launch and sustaining operations.
SCCDRL110 2	3.171.0-3	This Satellite Training Program Plan shall include: a) GOES-R satellite system and subsystem engineering descriptions, b) Training to be provided to the flight operation personnel for the GOES-R satellite, including nominal and contingency guidelines and considerations, and, c) Recommended certification guidelines and materials for operational staff certification.
SCCDRL110 3	3.172	3.172 Satellite Mission Operations Plan

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SCCDRL110 4	3.172.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> LO-04 2. <u>Title:</u> SATELLITE MISSION OPERATIONS PLAN 3. <u>Use:</u> The Satellite Mission Operations Plan provides an overview of all Contractor mission operations support activities. 4. <u>Preparation Information:</u>
SCCDRL110 5	3.172.0-2	<p>The Satellite Mission Operations Plan shall include the following as a minimum:</p> <ol style="list-style-type: none"> a) Mission operations organization and staffing profiles for all launch and on-orbit phases b) Overview of Mission Profile through spacecraft end-of-life c) Characteristics of Ground Network for all launch and on-orbit phases d) Overview of End-to-End testing program e) Overview of spacecraft operations timelines for all launch and on-orbit phases f) Ground system operations and INR Performance Verification g) Orbit Determination/Maneuver Planning Methodology h) Special considerations of two satellite operations (GOES-R and GOES-S), if appropriate
SCCDRL116 0	3.172.0-3	<p>The Satellite Mission Operations Plan shall include mission-critical events that include separation from the launch vehicle; power-up of major components or subsystems; deployment of mechanisms and/or mission-critical appendages; and all planned propulsive maneuvers required to establish mission orbit and/or achieve safe attitude.</p>
SCCDRL110 6	3.173	<p>3.173 Satellite Handover Review Data Package</p>
SCCDRL110 7	3.173.0-1	<p>DESCRIPTION OF REQUIRED DATA</p> <ol style="list-style-type: none"> 1. <u>CDRL No:</u> LO-05 2. <u>Title:</u> SATELLITE HANDOVER REVIEW DATA PACKAGE 3. <u>Use:</u> The Satellite Handover Review Data Package provides the government personnel with a status of the satellite at the start of post launch testing. 4. <u>Preparation Information:</u>
SCCDRL110 8	3.173.0-2	<p>The Satellite Handover Review Data Package shall provide the following information:</p> <ol style="list-style-type: none"> a) a) Data review (in the form of data plots/tables) of the results of operational performance identified during the (Launch and Orbit Raising (LOR) and bus checkout. b) Data review (in the form of data plots/tables) of diurnal signatures for key components (controls, power, thermal) c) Data review (in the form of data plots/tables) for all anomalies and unexpected behavior encountered by the spacecraft contractor during LOR and bus checkout, including: <ol style="list-style-type: none"> 1) Data showing the anomalous or unexpected behavior 2) Current status of their investigation and resolution 3) Descriptions of any workarounds and/or fixes

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SCCDRL110 8	3.173.0-2	<ul style="list-style-type: none">4) Data illustrating response to the workarounds and/or fixesd) Current status of all ground system problems, and database problems encountered by the spacecraft contractor during LOR and bus checkout<ul style="list-style-type: none">1) Current status of their investigation and resolution2) Descriptions of any workarounds and/or fixes3) Data illustrating response to the workarounds and/or fixese) Current detailed spacecraft equipment configurationf) Current detailed FSW configuration (status of RAM data changed since launch)g) Current spacecraft orbit solution (on day of handover)h) Current spacecraft propellant remaining including comparison with pre-launch budget predictionsi) List of current operations objective liens (i.e., what planned activities have not been accomplished)j) Description of any new operational constraints and procedure changes including description of any new workarounds implemented.