



# Geostationary Operational Environmental Satellites - R Series (GOES-R)

## SYSTEM REVIEW PLAN (SRP)

April 21, 2016



U.S. Department of Commerce (DOC)  
National Oceanic and Atmospheric Administration (NOAA)  
National Environmental Satellite, Data, and Information Services (NESDIS)  
National Aeronautics and Space Administration (NASA)

## GOES-R Series System Review Plan (SRP)

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Geostationary Operational Environmental Satellites - R Series (GOES-R)  
 System Review Plan (SRP)  
**CHANGE HISTORY LOG**

VERSION	CCR #	DATE	PAGES AFFECTED	DESCRIPTION
Baseline	1151	12/17/2007	ALL	Initial Release
2.0	2264A	02/11/2013	ALL	Updates to reflect program changes
2.1	2896	02/06/2015	2- 10; 12-19	<p>Page 2: Correct NPR-7120.5E version, move NPR-7123.1A to applicable documents, corrected LIRD document number, added SMD handbook to reference documents</p> <p>Page 3: Enterprise Infrastructure correction</p> <p>Page 4: Figure 1 revised for Ground and Flight Project structure,</p> <p>Page 5: Figure 2: MRR duplication deleted, MOR and FOR made Program level reviews, HRR and Handover Readiness flow revised.</p> <p>Page 6: KDP-E wording revised to comply with SMD Handbook, reference to Attachment 1 deleted. Launch Readiness Review and Handover Readiness removed from list of KDPs</p> <p>Page 7: Deleted reference to Attachment 1.</p> <p>Page 8: Table 1 administrative errors corrected, revised to comply with GSFC-STD-1001</p> <p>Page 9: Section 5.1 IIRT reporting clarified</p> <p>Page 10 and 12: JPRT established for Handover</p> <p>Page 12: Corrected document number</p> <p>Page 13: Section 6.2 reference to outdated GPR-8700.4 corrected</p> <p>Page 14: IIRT reporting clarified</p> <p>Page 15 and 16: Acronyms corrected, added</p> <p>Page 17-19: Attachment 1 deleted</p>
2.2	3008	04/21/2016	5, 8	<p>Page 5: Figure 2 Note modified to designate FOR as GOES-R review only</p> <p>Page 8: Table 1 Footnote 3 deleted from FOR, Footnote 2 modified to designate FOR as GOES-R review only</p>

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## **1 PURPOSE**

This document establishes the plan for conducting a comprehensive set of System Reviews of the next generation Geostationary Operational Environmental Satellites – R (GOES-R) Series Program. The GOES-R Series Program and Project review process consists of a phased sequence of reviews including; (a) Standing Review Board (SRB) assessments of program readiness at key development lifecycle milestones, (b) Integrated Independent Review Team (IIRT) assessments of the projects, and Engineering Peer Review (EPR) technical evaluations of various systems, subsystems, assemblies, and components, as necessary. The purpose of the GOES-R Series reviews is to reduce risk by evaluating the program's/project's progress relative to fixed expectation and success criteria at each evaluation point within the mission life cycle. This plan meets the intent of the GOES-R Series Management Control Plan (MCP) and the Goddard Procedural Requirements (GPR) 8700.4, Goddard Systems Reviews, as tailored to respond to the unique needs of the National Oceanic and Atmospheric Administration (NOAA) / National Aeronautics and Space Administration (NASA) partnership that is responsible for this program.

## 2 DOCUMENTS

### 2.1 APPLICABLE DOCUMENTS

The processes in each of the following documents or latest revisions thereof are applicable to the Integrated Independent Reviews for GOES-R Series:

- Department Administrative Order (DAO) 208-3 “Major System Acquisitions for the Department of Commerce”, December 1997
- Memorandum of Understanding between NASA and NOAA for the GOES-R Series Program, June 15, 2007
- GOES-R Series Management Control Plan, 410-R-PLN-0067
- GPR 1060.3, The Goddard Governance System
- NASA Procedural Directive (NPD) 8610.24, Launch Services Program Pre-launch Readiness Reviews
- Mission Requirements Document for the GOES-R Series, 410-R-MRD-0070
- GOES-R Concept of Operations (CONOPS), P417-R-CONOPS-0008
- GOES-R Series Program Systems Engineering Management Plan (SEMP), 410-R-PLN-0069
- GSFC-STD-1000, GSFC Rules for the Design, Development, Verification, and Operation of Flight Systems (GOLD Rules)
- GOES-R Level 1 Requirements Document (LIRD), 410-R-LIRD-0137
- NASA Procedural Requirements (NPR) 7120.5E NASA Space Flight Program and Project Management Requirements w/Changes 1-10
- NPR 7123.1A, NASA Systems Engineering Processes and Requirements

### 2.2 REFERENCE DOCUMENTS

The processes in the following documents or latest revisions thereof are reference for the Integrated Independent Reviews for GOES-R Series:

- GSFC-STD-1001A, Criteria for Flight and Flight Support Systems Lifecycle Reviews
- 410-R-PLN-0081, GOES-R Series Risk Management Plan
- GPR 8700.4, Goddard Systems Reviews
- GPR 8700.6, Engineering Peer Reviews
- NASA Science and Mission Directorate (SMD) Handbook

### **3 MISSION OVERVIEW AND DESCRIPTION**

The National Oceanic and Atmospheric Administration (NOAA) operates a system of environmental satellites in geostationary orbits to provide continuous weather imagery and monitoring of meteorological data for the United States, Latin America, much of Canada and most of the Atlantic and Pacific ocean basins. GOES satellites provide critical atmospheric, oceanic, climatic, and solar products supporting weather forecasting and warnings, climatologic analysis and prediction, ecosystems management, and safe and efficient public and private transportation. The GOES satellites also provide a platform for space environmental observations, and auxiliary communications services that provide for GOES data rebroadcast, data collection platform relay, low resolution imagery, emergency weather communications, and satellite aided search and rescue.

The GOES-R Series is a collaborative development and acquisition effort between NOAA and the National Aeronautics and Space Administration (NASA). Program activities occur at the co-located Program and Project Offices at Goddard Space Flight Center, Greenbelt, MD.

#### **3.1 GOES-R Program Description**

The GOES-R Series system includes spacecraft, instruments, launch services, and all associated ground system elements and operations for four satellites (GOES-R/S/T/U). The GOES-R Series program, in accordance with the NASA Procedural Requirements (NPR) 7120.5, is defined as a single-project program due to the interrelated nature of the ground and flight projects. Additionally, due to its national importance and program life cycle costs, the GOES-R Series program is assigned as a Category 1 program and has a risk classification of B per NPR 8705.4, Risk Classification for NASA Payloads. The GOES-R Series is also defined as a High Impact system in accordance with the Federal Information Processing Standards (FIPS) 199.

##### **3.1.1 GOES-R Space Segment**

The baseline GOES-R Series space segment consists of four spacecraft containing the following payloads: a) Advanced Baseline Imager (ABI); b) Space Environment In-Situ Suite (SEISS); c) Solar Ultraviolet Imager (SUVI); d) Extreme Ultraviolet and X-Ray Irradiance Sensors (EXIS); e) Geostationary Lightning Mapper (GLM); and f) Magnetometer (MAG).

The GOES-R Series system will provide the following set of auxiliary communications services: 1) GOES Rebroadcast (GRB), and 2) Unique Payload Services (UPS). UPS is further broken down into four services: 1) High Rate Information Transmission (HRIT); 2) Emergency Managers Weather Information Network (EMWIN); 3) Search and Rescue (SAR); and 4) Data Collection System (DCS).

##### **3.1.2 GOES-R Series Ground Segment**

The Ground Segment encompasses the following four major functions: 1) Mission Management (MM), 2) Enterprise Infrastructure (EI), 3) Product Generation (PG), and 4) Product Distribution (PD). Mission Management (MM) includes mission scheduling, satellite (including instrument) operations, satellite state-of-health trending, orbital analysis, and ground operations. Enterprise Infrastructure (EI) supports all operational functions by monitoring, assessing, and controlling the configuration of the operational systems, networks, and communications for the GOES-R Series ground segment. Product Generation (PG) includes algorithm support, processed raw data, processing to Level 1b (including calibration, navigation and registration), generation of the data for rebroadcast, and for higher level data creation including operational derived products. Product Distribution (PD) includes distribution of Level 1b, Level 2+, and derived products to user portals while addressing interfaces with the user for accessing GOES data.

### 3.2 GOES-R Organization

A graphic illustration of the GOES-R Series Organization is shown in Figure 1. The GOES-R Series Program is NOAA led, with an integrated NOAA-NASA program office organization.

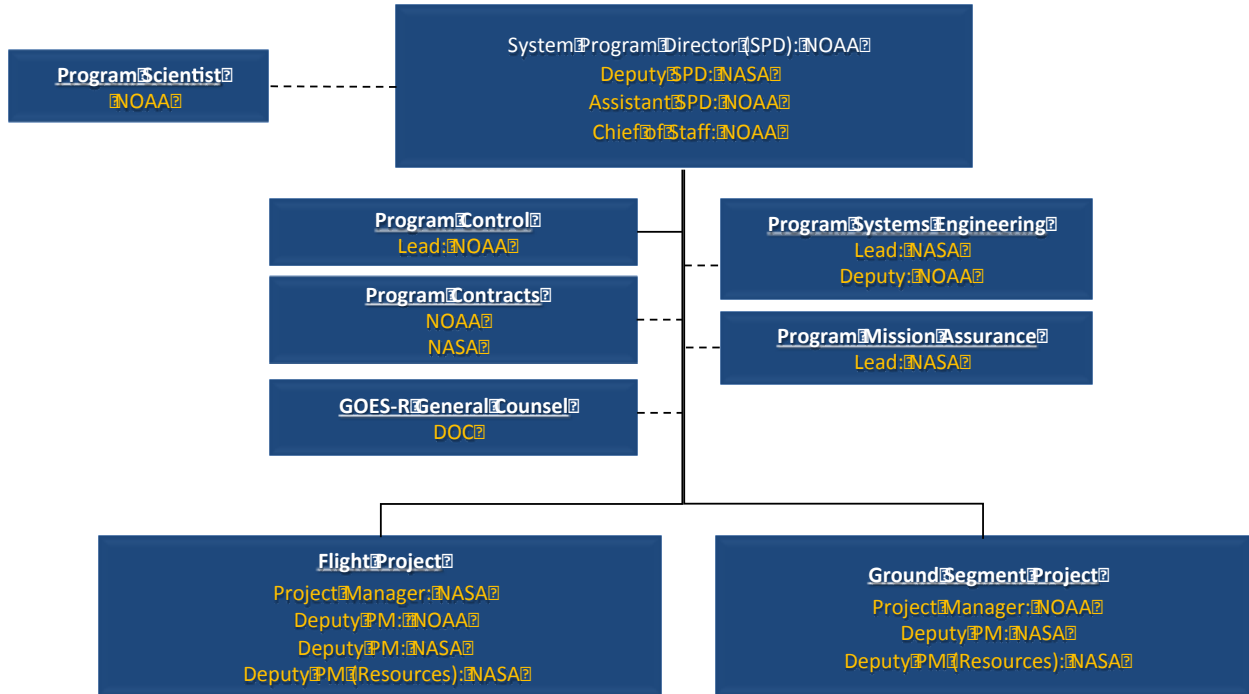


Figure 1 GOES-R Program Organization



### 4 SCOPE OF GOES-R SERIES INDEPENDENT REVIEWS

Reviews will be held at the milestones identified in Figure 2 and are described below.

PDRR	Acquisition and Operations					
	Phase B: Preliminary Design & Technology Completion	Phase C: Final Design & Fabrication	Phase D: System Assembly, Integration & Test, Launch & Checkout	Launch	Phase E: Operations & Sustainment	Phase F: Closeout
Decision Milestones	KDP <sup>B1</sup> KDP <sup>B2</sup> ▲	KDP <sup>C1</sup> KDP <sup>C2</sup> ▲	KDP <sup>D</sup> ▲		Handover <sup>E</sup> ▲	KDP <sup>F</sup> ▲
Decision- maker	NOAA <sup>B</sup> US <sup>B</sup>	NOAA <sup>C</sup> US <sup>C</sup>	NOAA <sup>D</sup> DUS <sup>D</sup>	NOAA <sup>E</sup> DUS <sup>E</sup>	NESDIS <sup>E</sup> AA <sup>E</sup>	NESDIS <sup>F</sup> AA <sup>F</sup>
Gateway Reviews	NOAA <sup>B</sup> PMC <sup>B</sup> ↑ GSFC <sup>B</sup> CMC <sup>B</sup>	NOAA-NASA <sup>C</sup> PMC <sup>C</sup> ↑ NESDIS-SMD <sup>C</sup> PMC <sup>C</sup> ↑ GSFC <sup>C</sup> CMC <sup>C</sup>	NOAA-NASA <sup>D</sup> PMC <sup>D</sup> ↑ NESDIS-SMD <sup>D</sup> PMC <sup>D</sup> ↑ GSFC <sup>D</sup> CMC <sup>D</sup>	NOAA-NASA <sup>E</sup> PMC <sup>E</sup> ↑ NESDIS-SMD <sup>E</sup> PMC <sup>E</sup> ↑ GSFC <sup>E</sup> CMC <sup>E</sup> (MRR) <sup>E</sup>	NESDIS-SMD <sup>E</sup> PMC <sup>E</sup> ↑ GSFC <sup>E</sup> CMC <sup>E</sup> ↑ HRR <sup>E</sup>	NESDIS-SMD <sup>F</sup> PMC <sup>F</sup> ↑ GSFC <sup>F</sup> CMC <sup>F</sup>
Program Reviews	SRR <sup>B</sup> SDR <sup>B</sup>	PDR <sup>C</sup> CDR <sup>C</sup>	MOR <sup>D</sup> SIR <sup>D</sup>	FOR <sup>E</sup> ORR <sup>E</sup>	PLAR <sup>E</sup>	DR <sup>F</sup>
Other Reviews				SMSR <sup>E</sup> FRR <sup>E</sup> LRR <sup>E</sup>		
Supporting Reviews	Peer Reviews, System, Element, Subsystem, Software, Etc. as Specified in System Review Plan and Program and Project System Engineering Plans					

Only reviews post-MOR apply to GOES-S, T, and U. FOR for GOES-R only.

Figure 2 GOES-R Series Program and Project Milestones for Systems Reviews

#### **4.1 Key Decision Points (KDP)**

There are five Key Decision Points and two readiness milestone reviews identified for the GOES R Series program. The Secretary of Commerce is the designated KDP Milestone Decision Authority for Department of Commerce KDP Milestone Decisions. The Secretary delegated the KDP decision authority to the NOAA Administrator (Under Secretary of Commerce for Oceans and Atmosphere) on December 21, 2007.

- KDP B: The NOAA Administrator authorized the GOES-R Series program to proceed to implementation (acquisition and operations) phase on January 4, 2008. This allowed the program to begin the source selection processes for the spacecraft and ground systems.
- KDP C - Program Baseline Review: Budget and Schedule baselines are established for DOC and congressional oversight purposes. This is the baseline to which NOAA will hold the GOES-R Series program accountable. The NOAA US is the approval authority for KDP C
- KDP D - Mission Integration Readiness: The Program will certify that the projects are prepared to be integrated into an end-to-end GOES-R Series system. This transition is uniquely a "soft gate," in which the program may initiate integration work immediately, absent a notice of discontinuance by the NOAA Deputy Under Secretary for Operations (DUS/O) who is the decision authority for this milestone.
- KDP E - Operational Readiness: The program is evaluated for satellite launch and mission system operation. The decision authority for this milestone is the NOAA DUS/O.
- KDP F - End of Mission: Signals the end of the operational use of the system and the beginning of the disposal phase. The decision authority is the NESDIS AA.

#### **4.2 Program Readiness Reviews**

Program readiness reviews will be held to determine readiness for KDP reviews. The NOAA-NASA Program Management Council (PMC) is the decision forum for the readiness reviews with the exception of the Handover Readiness Review and KDP F. For these exceptions, the NESDIS/SMD PMC is the readiness decision forum. The NOAA-NASA PMC reviews will be preceded by a GSFC Center Management Council (CMC) readiness review and a NESDIS/SMD PMC readiness review, the results of which will be presented as a recommendation for readiness to the NOAA-NASA PMC to support the readiness review decision. The Joint NESDIS/SMD PMC readiness reviews will be preceded by a GSFC CMC readiness review, the results of which will be presented as an advisory assessment to the Joint NESDIS/SMD PMC to support the readiness review decision.

#### **4.3 Product Maturity for Readiness Reviews**

The Project Milestone Product Maturity Matrix (Table 4-3) and the Project Control Plan Maturity Matrix (Table 4-4) from the NPR 7120.5 will be used for each program/project milestone review, as applicable.

#### **4.4 Milestone Reviews**

The GOES-R Series program will have Program and Project milestone reviews. Project milestone reviews will be conducted by Integrated Independent Review Teams (IIRT), as described in section 5, in accordance with GPR 8700.4, Goddard Systems Reviews. These milestones are identified in Figure 2, GOES-R Series Program and Project Milestones for Systems Reviews and Table 1, Critical GOES-R Series Program Milestones. The definition and objectives of each critical milestone review can be found GSFC-STD-1001.

The Standing Review Boards (SRB) will conduct program milestone reviews shown in Table 1 in accordance with the procedures described in section 6. The definition and objectives of each milestone review can be found in GSFC-STD-1001. Program milestone reviews will include a summary of the key

findings from previous project-level reviews with updates if appropriate. The intent of these program reviews is to ensure all program elements have met the criteria for a particular milestone.

Reviews for GOES-R Series follow-on spacecraft could be streamlined and tailored at a later date, as appropriate.

The review milestones will be captured, maintained and updated monthly on the GOES-R Series Integrated Program Master Schedule (IPMS).

Table 1 Critical GOES-R Series Program Milestones

Reviews	Program	Ground Segment					Flight Segment					
		Segment	Core	CLASS	PDA	AS	Spacecraft	ABI	EXIS	SUVI	SEISS	GLM
SRR	SRB	IIRT	IIRT	IIRT <sup>5</sup>	IIRT <sup>5</sup>	IIRT	IIRT	IIRT	IIRT	IIRT	IIRT	IIRT
SDR	SRB	IIRT	IIRT	IIRT <sup>5</sup>	IIRT <sup>5</sup>	IIRT	IIRT	IIRT	IIRT	IIRT	IIRT	IIRT
PDR	SRB	IIRT	IIRT	IIRT <sup>5</sup>	IIRT <sup>5</sup>	IIRT	IIRT	IIRT	IIRT	IIRT	IIRT	IIRT
CDR	SRB	IIRT	IIRT	IIRT <sup>5</sup>	IIRT <sup>5</sup>	IIRT	IIRT	IIRT	IIRT	IIRT	IIRT	IIRT
MOR	IIRT <sup>2</sup>											
SIR	SRB <sup>3</sup>											
FOR	IIRT <sup>2</sup>											
ORR <sup>7</sup>	SRB <sup>3</sup>											
PSR <sup>7</sup>							IIRT <sup>3</sup>	IIRT <sup>3</sup>	IIRT <sup>3</sup>	IIRT <sup>3</sup>	IIRT <sup>3</sup>	IIRT <sup>3</sup>
MRR	GSFC CMC <sup>3</sup>											
SMSR <sup>1</sup>	NASA HQ <sup>3</sup>											
FRR	KSC <sup>3,4</sup>											
LRR	KSC <sup>3,4</sup>											
PLAR	IIRT <sup>2,3</sup>											
HRR	JPRT <sup>3,6</sup>											

<sup>1</sup> This review is not an SRB review, but is compliant with the MCP and conducted by NASA HQ OSMA and NASA Chief Engineer.

<sup>2</sup> The MOR, FOR and PLAR will be chaired by an IIRT comprising members of both the Flight and Ground Review Teams. MOR and FOR are for GOES-R only

<sup>3</sup> Reviews also required for GOES S, T, and U.

<sup>4</sup> Kennedy Space Center-chaired review, requirements/criteria not included in this document.

<sup>5</sup> IIRT supports but does not chair these reviews.

<sup>6</sup> Joint Program Review Team (JPRT), co-chaired by OSPO and GOES-R, will comprise senior NOAA decision-makers. Results will be briefed to the NESDIS AA for approval.

<sup>7</sup> ORR and PSR may be combined into a single SRB-led review if conditions warrant.

## **5 GOES-R REVIEW BOARDS**

The GOES-R Series program uses two types of Review Boards—Integrated Independent Review Teams at the Project and element levels, and the Standing Review Board for Mission (Program) level reviews.

### **5.1 INTEGRATED INDEPENDENT REVIEW TEAM (IIRT)**

The GSFC Chief of the System Review Office (SRO) convenes the GOES-R Series Integrated Independent Review Teams (IIRT).<sup>1</sup> The GSFC SRO chief selects the GOES-R Series IIRT chair(s) and members in a memorandum to the respective GOES-R Project Manager. There are separate IIRTs for the Flight and Ground Segment Projects.

The GOES-R Series IIRTs will comprise experts in both NASA and NOAA systems who are fully independent of the GOES-R Series Program Office. The IIRTs are to provide expert technical review of the respective flight or ground segment elements. Through the planned series of milestone reviews, the IIRTs will evaluate the adequacy of the planning, design, and implementation and associated processes to safely and successfully accomplish the project requirements.

The IIRT chair(s) conduct the reviews and report completion of milestone review assessments to GSFC Code 300, who forwards the report to the respective Project Manager.

The IIRTs shall consist of technical and systems management experts with the composite ability to address the full scope required of the Projects for project-level reviews, with particular emphasis on assessing the areas of highest risk. A typical IIRT size is on the order of five (5) to twelve (12) team members. A portion of the members of the IIRTs shall be from outside of NASA and all other institutions and supplier organizations participating in the GOES-R Series procurement. This is to provide assurance that a broad range of best practices and lessons learned is applied from outside of the participating institutions. The IIRTs are not expected to mirror, on a strict one-to-one basis, the subsystems and engineering disciplines of the GOES-R Series Project being reviewed.

Members of review teams are chosen by the IIRT Co-chairs based on their combined expertise, objectivity and their ability to make a broad assessment of the implementation of the project being reviewed. Review team continuity throughout the program lifecycle is desirable, in order to limit retraining. For Flight Project and Ground Segment Project reviews, the full IIRT membership shall be documented in an Appointment Letter from the SRO Chief to the appropriate GOES-R Series Project Manager with distribution to the GSFC CMC Chair, the NOAA NESDIS Deputy Assistant Administrator for Systems (DAAS), and the GOES-R Series System Program Director, prior to each review.

### **5.2 STANDING REVIEW BOARD (SRB)**

The GOES-R Series Standing Review Board (SRB) is convened by the NOAA DUS/O and the NASA Associate Administrator (AA). The NOAA DUS/O and NASA AA determine the scope and chairmanship of the SRB. The NESDIS AA and the GSFC Deputy Director approve team membership.

The SRB will comprise experts in both NASA and NOAA systems that are fully independent of the GOES-R Series Program Office. The SRB is to provide expert technical review of the full end-to-end mission

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<sup>1</sup> GPR8700.4H, released after GOES-R was established, has replaced IIRTs with Goddard System Review Teams (GSRTs). This document uses IIRTs in the same context as the GPR8700.4H uses GSRTs.

system. Through the planned series of milestone reviews, the SRB will evaluate the adequacy of the planning, design, and implementation and associated processes to safely and successfully accomplish the mission requirements. The SRB will also assess GOES-R Series programmatic approach, performance, risk posture and ability to deliver on commitments as baselined by the GOES-R Series Program Office.

The chair(s), accountable to the NOAA-NASA PMC, conduct the reviews and report completion of milestone reviews to the GSFC CMC and the NOAA-NASA PMC.

The SRB shall consist of technical and systems management experts with the composite ability to address the full scope required for program level reviews, with particular emphasis on assessing the areas of highest risk. A typical SRB size is on the order of five (5) to twelve (12) team members. A portion of the members of the SRB shall be from outside of NASA and all other participating institutions and supplier organizations. This is to provide assurance that a broad range of best practices and lessons learned is applied from outside of the participating institutions. The SRB is not expected to mirror, on a strict one to one basis, the subsystems and engineering disciplines of the GOES-R Series Program.

Members of review teams are recommended by the SRB chair(s) based on their combined expertise, objectivity, and their ability to make a broad assessment of the implementation of the program. Review team continuity throughout the program lifecycle is desirable, in order to limit retraining.

### **5.3 JOINT PROGRAM REVIEW TEAM (JPRT)**

The JPRT is established to conduct the Handover Readiness Review. At a minimum, the JPRT will comprise representatives from GOES-R and OSPO management and be co-chaired by a designee from each of the GOES-R and OSPO programs. The handover lead will coordinate discussions with GOES-R and OSPO management to establish handover success criteria prior to HRR that are representative of inter-program handover goals and objectives. Handover success criteria are defined and applied in order to identify the activities that must be completed or satisfied in order to successfully complete the formal mission handover from GOES-R to OSPO. The JPRT will be established to assess the defined set of success criteria and associated timeline for the transition and handover as well as the ultimate successful completion of these criteria during the HRR. The handover success criteria described within the Transition, Handover & Systems Acceptance Plan will be reviewed, finalized, and baselined no later than MRR.

## **6 REVIEW RESPONSIBILITIES**

### **6.1 IIRT RESPONSIBILITY**

The primary responsibility of the IIRTs is to provide expert technical review of all of the flight project and ground segment elements enumerated herein through the series of independent reviews identified in this plan.

The IIRT shall:

- evaluate the adequacy of the planning, design, implementation and use of associated processes by the Project to safely and successfully accomplish the Mission requirements in accordance with the processes in applicable standards to include the GOES-R Series Management Control Plan (MCP), GSFC Integrated Independent Reviews (GPR 8700.4), GSFC Rules for Design, Development Verification and Operation of Flight Systems (GOLD Rules) (GSFC-STD-1000) and Criteria for Flight and Flight Support Systems Lifecycle Reviews (GSFC-STD-1001)
- assess technical performance and ability of the Projects to deliver on commitments as documented in the following:
  - GOES-R Series Mission Requirements Document, 410-R-MRD-0070
  - GOES-R Series Management Control Plan, 410-R-PLN-0067
- confirm the documentation of and assess the compatibility of the success criteria, acceptable risk and allocated resources
- evaluate the technical content, schedule, and staffing of the Project over the entire life cycle
- assess system resource management and margins (e.g. mass, power, propellant)
- assess technical progress, risks remaining and mitigation plans
- assess the safety hazards, and hazard mitigation and control strategies
- assess progress/milestone achievement against approved baselines
- determine if any deficiencies exist that result in revised projections exceeding predetermined thresholds
- confirm that the Project team has queried the NASA Lessons Learned Information System (LLIS), other knowledge resources provided by the NASA Engineering Network (NEN <http://nen.nasa.gov/>), and NOAA lessons learned, as appropriate.
- assist the Project team in recognizing lessons learned, and encourage Project team members to apply past knowledge for current and future mission success by submitting their own significant lessons learned and related experiences to the web-based NEN providing an integrated set of resources that facilitates sharing, learning, and communication in the community.

### **6.2 SRB RESPONSIBILITY**

The primary responsibility of the SRB is to provide expert technical review of all of the mission system elements enumerated herein through the series of Independent Reviews identified in this plan. The SRB shall:

- evaluate the adequacy of the planning, design, implementation and use of associated processes by the Program to safely and successfully accomplish the Mission requirements in accordance with the processes in applicable standards to include the GOES-R Management Control Plan (MCP), Goddard Systems Reviews (GPR 8700.4), GSFC Rules for Design, Development Verification and Operation of

Flight Systems (GOLD Rules) (GSFC-STD-1000) and Criteria for Flight and Flight Support Systems Lifecycle Reviews (GSFC-STD-1001)

- assess programmatic performance and ability of the Program to deliver on commitments as documented in the following:
  - GOES-R Series Level I Requirements Document (LIRD), 410-R-LIRD-0137
  - GOES-R Series Mission Requirements Document, 410-R-MRD-0070
  - GOES-R Series Management Control Plan, 410-R-PLN-0067
- confirm the documentation of and assess the compatibility of the success criteria, acceptable risk and allocated resources
- evaluate the technical content, schedule, staffing and cost of the Program over the entire life cycle
- assess system resource management and margins
- assess technical progress, risks remaining and mitigation plans
- assess the safety hazards, and hazard mitigation and control strategies
- assess progress/milestone achievement against approved baselines
- determine if any deficiencies exist that result in revised projections exceeding predetermined thresholds
- confirm that the Program team has queried the NASA Lessons Learned Information System (LLIS), other knowledge resources provided by the NASA Engineering Network (NEN, <http://nen.nasa.gov/>), and NOAA lessons learned, as appropriate.
- assist the Program team in recognizing lessons learned, and encourage Program team members to apply past knowledge for current and future mission success by submitting their own significant lessons learned and related experiences to the web-based NEN providing an integrated set of resources that facilitates sharing, learning, and communication in the community.

### **6.3 JPRT RESPONSIBILITY**

The primary responsibility of the JPRT is to provide expert opinion on readiness to handover the GOES-R system (observatory and Ground system) operations from NESDIS/GOES-R to NESDIS/OSPO control. The recommendation from the JPRT will be briefed to the NESDIS AA for formal decision.

The JPRT shall:

- Determine if the program has completed post-launch testing sufficiently and can demonstrate readiness of the system and processes to allow handover of satellite and ground system control from GOES-R to OSPO.
- Assess OSPO personnel training ability and organizational readiness to accept satellite control authority and ground system operational control transfer from GOES-R

### **6.4 PROGRAM RESPONSIBILITY**

The primary responsibility of the GOES-R Series Program is to develop the GOES-R Series System in compliance with the planning, design, implementation, management, and operational standards prescribed in GPR 8700.4, Goddard Systems Reviews, GSFC-STD-1001, Criteria for Flight and Flight Support Systems Lifecycle Reviews and GSFC-STD-1000, Rules for the Design, Development, Verification, and Operation of Flight Systems demonstrated through the series of Independent Reviews identified in this SRP. The extent to which the individual elements shall be addressed by the reviews is the following:



- Payload – fully addressed
- Spacecraft – fully addressed
- Launch Vehicle Interface & Integration – performed by KSC, with Project/Program/SRB participation
- Ground System – fully addressed
- Mission Operations, Data Capture, Analysis and Distribution – fully addressed

The GOES-R Series Program and Projects shall:

- support the system reviews through a comprehensive set of engineering peer reviews conducted in accordance with GPR 8700.6, Engineering Peer Reviews, and as described in the GOES-R Series Systems Engineering Management Plan, 410-R-PLN-0069. The GOES-R Series Program/Projects will conduct Engineering Peer Reviews on all mission subsystems, including hardware, software, and operations. The approach to engineering peer reviews accommodates extremely detailed reviews, and maximizes the effectiveness of each review while maintaining reporting and accountability to the system review teams, and ensures the infusion of expert knowledge appropriate for each peer review. Summary reports of the peer review results will be provided at the mission system level reviews.
- pay particular attention to the entrance and success criteria identified in NPR 7123.1A for the appropriate review.
- design, develop, verify, and operate all products in accordance with the GSFC Rules (GSFC-STD-1000) or obtain the necessary waivers. (The “GOLD Rules” are a high-level subset of all the design rules required for safety and mission success for all space flight products. They spell out the technical or design requirements that every Goddard program shall meet, regardless of implementation approach.)
- present Request For Action (RFA) status monthly as part of program and project MSRs.
- make available to the Standing Review Board chair(s) all relevant review presentation materials at least five (5) working days prior to the start of a review.
- alert the Standing Review Board chair(s) to any special concerns the program might have prior to the review.
- confer with the Standing Review Board chair(s) regarding scheduling changes and material content reviews.
- coordinate review/facility logistics to include security/badging, teleconference, internet access, local travel information, etc.
- query the NASA Lessons Learned Information System (LLIS, <http://llis.nasa.gov>), NOAA Lessons Learned and other knowledge resources, as appropriate, to access relevant past experiences and knowledge that can be leveraged to reduce risk, improve quality and efficiency.
- take into consideration the Standing Review Board’s advice and expert assessment of the technical and programmatic approach, risk posture, and progress against the program/project baseline.

## **7 REPORTING AND REQUEST FOR ACTION (RFA) CLOSURE**

For Project and subsystem level reviews, the IIRT shall brief the GOES-R Series Project Teams on their initial impressions and the RFAs generated at the conclusion of each review. The IIRT Co-Chairs will coordinate the RFAs and issue the RFAs and final report to the appropriate GOES-R Series Project Manager, with a copy to the GOES-R Series System Program Director and Program System Engineer within 3 weeks of each review. The GOES-R Series Project Managers will submit project-level RFA responses to the Co-Chairs.

For GOES-R Series IIRTs, the results of milestone review assessments will be provided to the GSFC CMC and NOAA-NASA PMC during routine monthly reporting.

For Program-level reviews, the SRB shall debrief the Program Team and the System Program Director, as well as the Project teams, at the conclusion of the review. The SRB shall also debrief the NESDIS DAAS and the GSFC Deputy Center Director. The GOES-R Series System Program Director shall report summary results of all SRB reviews to the GSFC Center Management Council during the Monthly Status Review following each review. For Program-level reviews, the System Program Director will submit RFA responses to the SRB chair(s) for formal closure of the RFA. The SRB team and GOES-R Series Program shall coordinate the submittal, review, and closure of the RFA responses through the GSFC Review Management System (GRMS). Each program-level review report shall show a roll-up of residual risks assessed by the team at the review.

The GOES-R Series SRB will brief the results of milestone review assessments to a NOAA-NASA PMC to which GSFC CMC and NESDIS/SMD PMC members have been invited.

## 8 ACRONYMS

AA	Associate Administrator (NASA)
AA	Assistant Administrator (NOAA)
ABI	Advanced Baseline Imager
CDR	Critical Design Review
CLASS	Comprehensive Large Array-data Stewardship System
CMC	Center Management Council
DCS	Data Collection System
DOC	Department of Commerce
EHIS	Energetic Heavy Ion Sensor
ELV	Expendable Launch Vehicle
EM	Enterprise Management
EMWIN	Emergency Manager's Weather Information Network
EUVS	Extreme Ultra Violet Sensor
EXIS	EUVS and XRS Irradiance Sensors
FOR	Flight Operations Review
FRR	Flight Readiness Review
GLM	Geostationary Lightning Mapper
GOES	Geostationary Operational Environmental Satellites
HRR	Handover Readiness Review
IIRT	Integrated Independent Review Team
JPRT	Joint Program Review Team
LIRD	Level 1 Requirements Document
LLIS	Lessons Learned Information System
LRIT	Low Rate Information Transmission
LRR	Launch Readiness Review
MDR	Mission Definition Review
MM	Mission Management
MOR	Mission Operations Review
MOU	Memorandum of Understanding
MPS	Magnetospheric Particle Sensor
MRR	Mission Readiness Review
NASA	National Aeronautics and Space Administration
NEN	NASA Engineering Network
NOAA	National Oceanic and Atmospheric Administration
ORR	Operational Readiness Review
PD	Product Distribution
PDR	Preliminary Design Review
PER	Pre-Environmental Review
PG	Product Generation
PLAR	Post-Launch Assessment Review
PMC	Program Management Council
PSR	Pre-Shipment Review
RFA	Request for Action

SAR	Search and Rescue
SDR	System Definition Review
SEISS	Space Environment In-Situ Suite
SGPS	Solar and Galactic Proton Sensor
SIR	System Integration Review
SMA	Safety and Mission Assurance
SMD	Science Mission Directorate
SMS	Synchronous Meteorological Satellite
SMSR	Safety and Mission Success Review
SRB	Standing Review Board
SRP	System Review Plan
SRR	System Requirements Review
SUVI	Solar Ultraviolet Imager
US	Under Secretary for Oceans and Atmosphere
XRS	X-Ray Sensor