



# GOES-R – System Validation and User Readiness Planning

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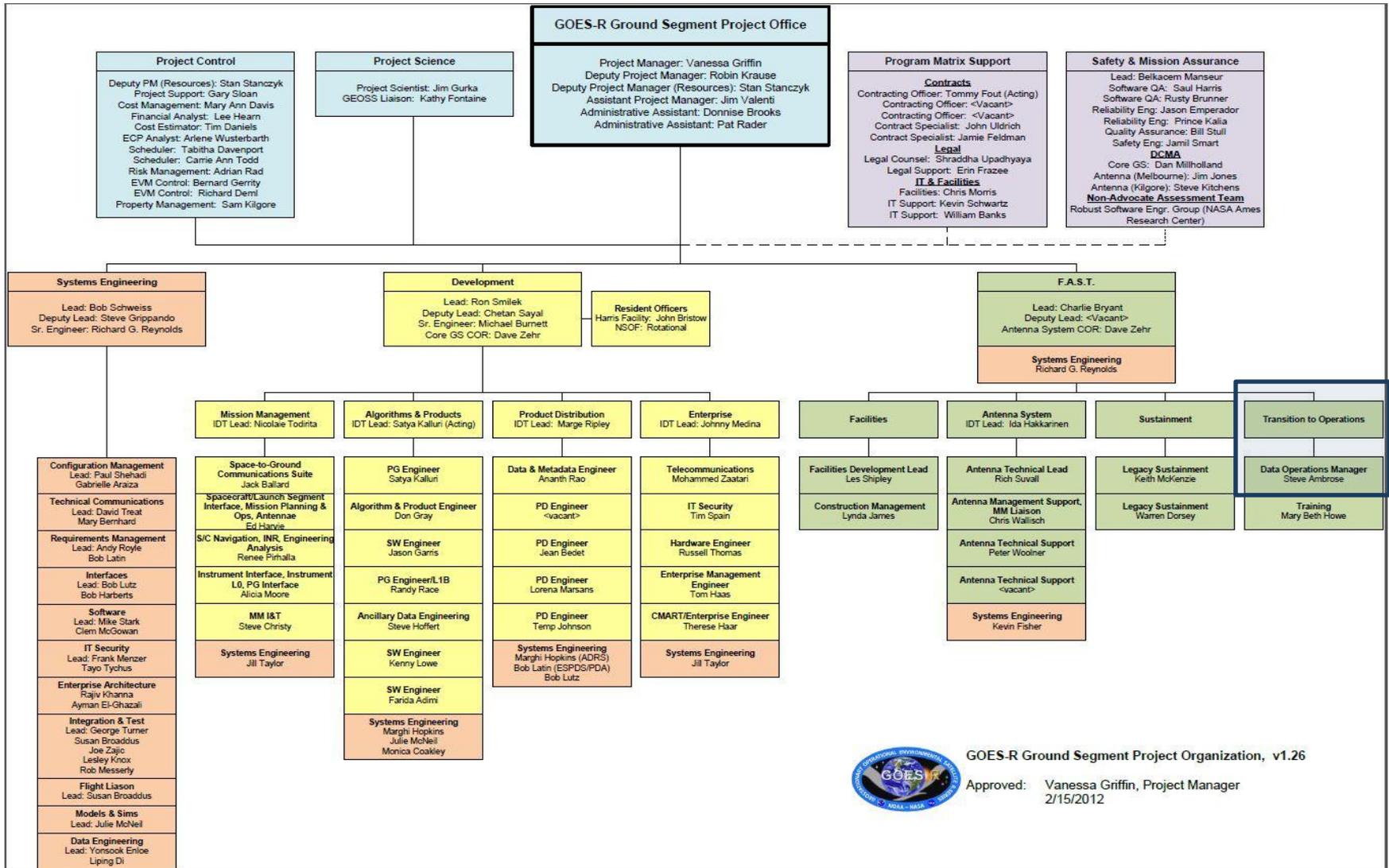


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# Ground Segment Project Organization

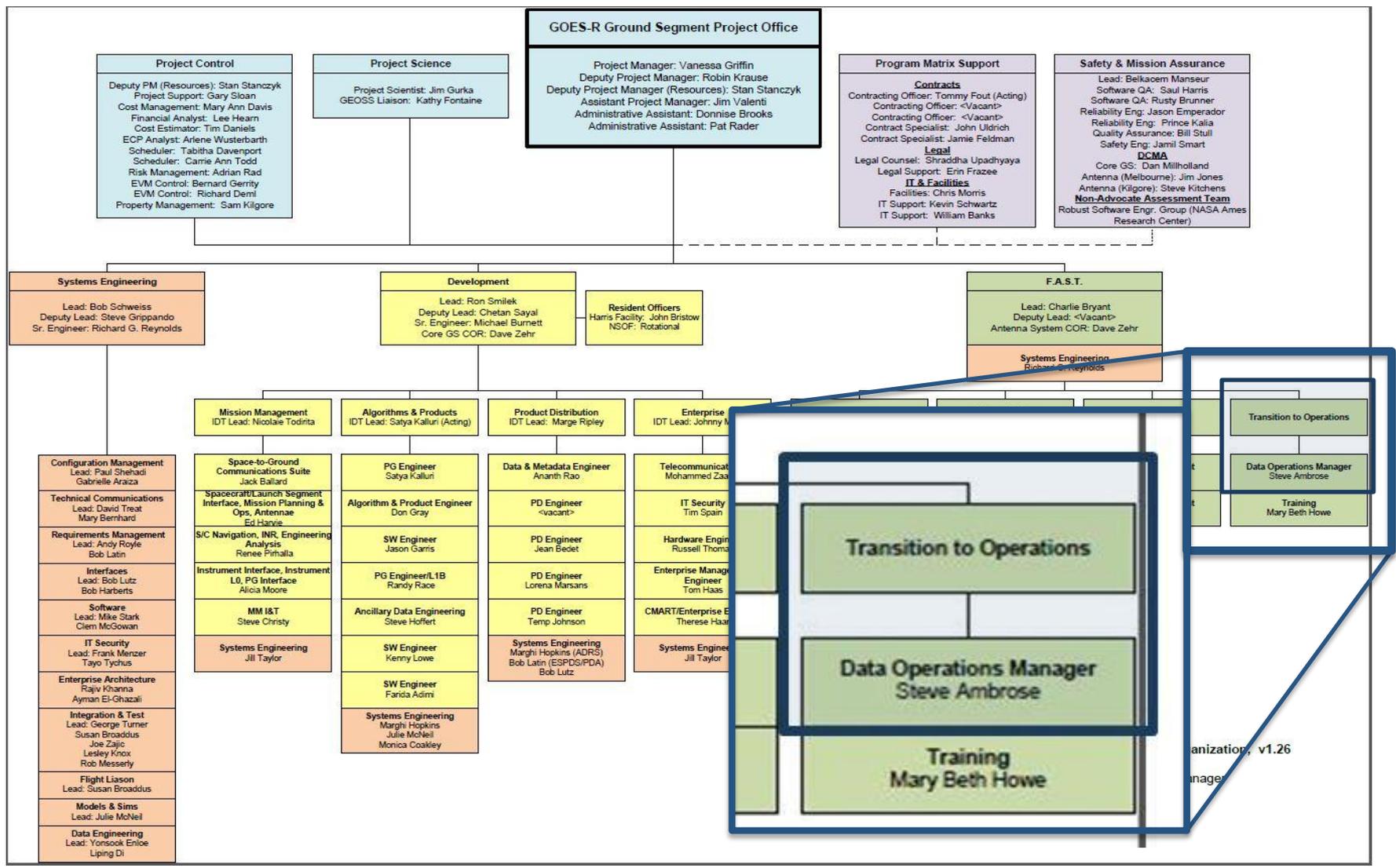


GOES-R Ground Segment Project Organization, v1.26

Approved: Vanessa Griffin, Project Manager  
2/15/2012

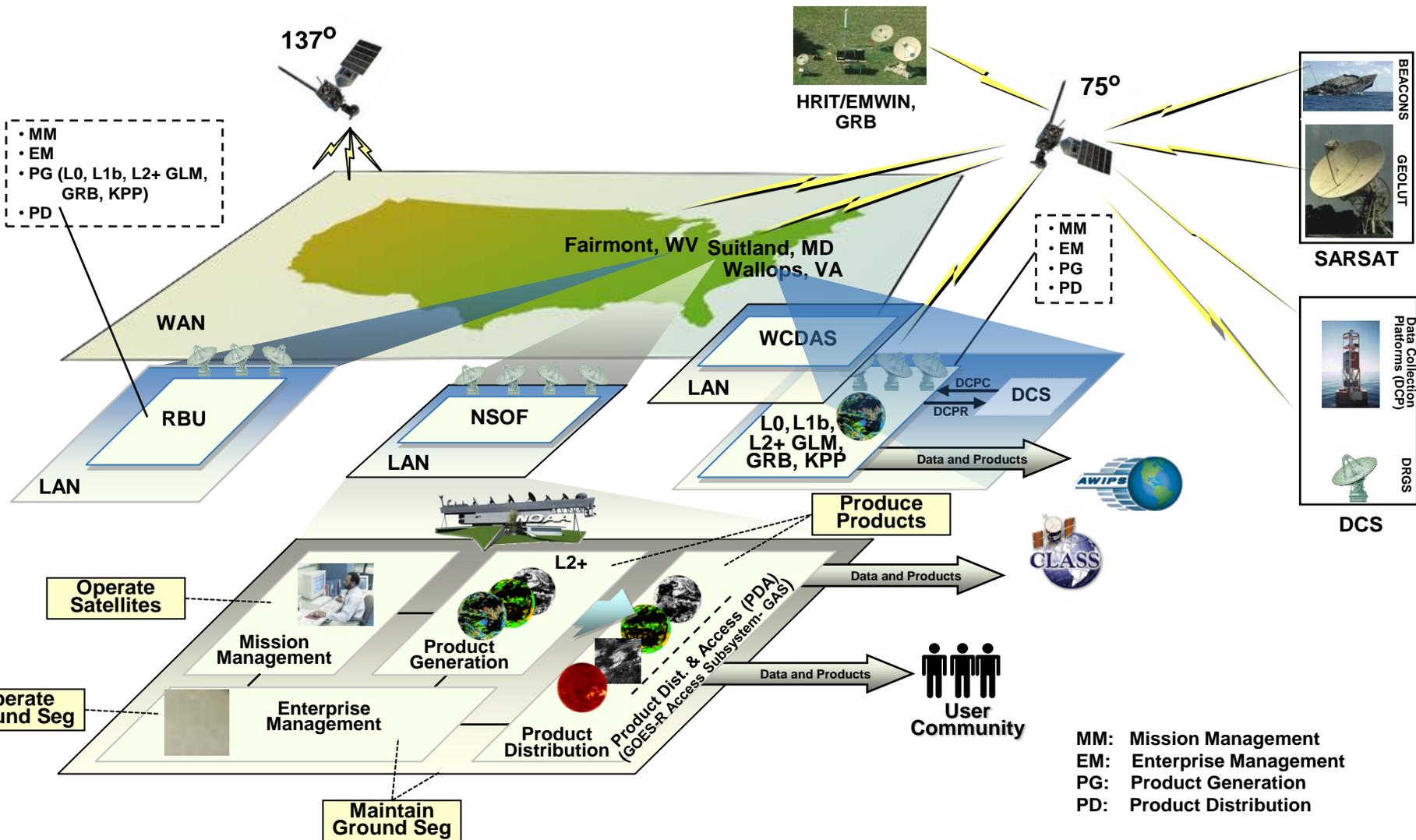


# Ground Segment Project Organization





# The GOES-R System-Operational View





# GOES-R Government Roles and Responsibilities

<b>Ground Segment Project Office</b>	Leads, coordinates, performs Ground Segment design, development, validation, system engineering, integration, and testing
<b>Office of Systems Development (OSD)</b>	PDA development - 7-day storage/Access Point ADRS development – Ancillary Data Relay System (“broker”) Domain-5 development – HRIT/EMWIN modulation/encoding CLASS upgrades - archive system Facilities upgrades
<b>Office of Satellite Processing and Operations (OSPO)</b>	Terrestrial telecommunications (HRIT/EMWIN), Products, Users, Operations
<b>Algorithm Working Group (AWG)</b>	Technical leadership and management of algorithm development, verification, and delivery. Level 1b cal/val (post-operational) Level 2+ Algorithm packages, including proxy data input and simulated output Level 2+ product validation and validation tool set
<b>Center for Satellite Applications and Research (STAR)</b>	Level 2+ Algorithm Theoretical Basis Document (ATBD) verification prior to delivery to GSP, science validation



# GOES-R System Level Validation

**Validation determines whether or not the system as implemented meets the intended use of the operators and user as developed by the contractor for the government**

- Validation of GOES-R is based on the MRD and the CONOPS
  - Users will be closely involved in the development of validation tests to ensure the evaluation program accurately assesses the entire system performance and user needs
  - Validation will be accomplished through the application of realistic and comprehensive use cases, high-fidelity test data, and operational environments and scenarios
- The goal of the GOES-R System Validation program is to ensure the system is completely validated end-to-end prior to handover to OSPO.
- This is not the Science Validation effort



# The DOM's Validation Plan

- Objectives of the validation will be based on the Mission Requirements Document (MRD)
- Validation is shared among mission, calibration and data/products through the MRD
- Some validation tests will be shared by mission, calibration and data/product operations
- The CONOPS is used as a guide to operational scenarios
- Validation will consist of product tests, both pre-launch and post launch
- In about a year a Data Operations Support Team (DOST) will come together to support testing and eventual operations
- Members of the DOST is to be determined

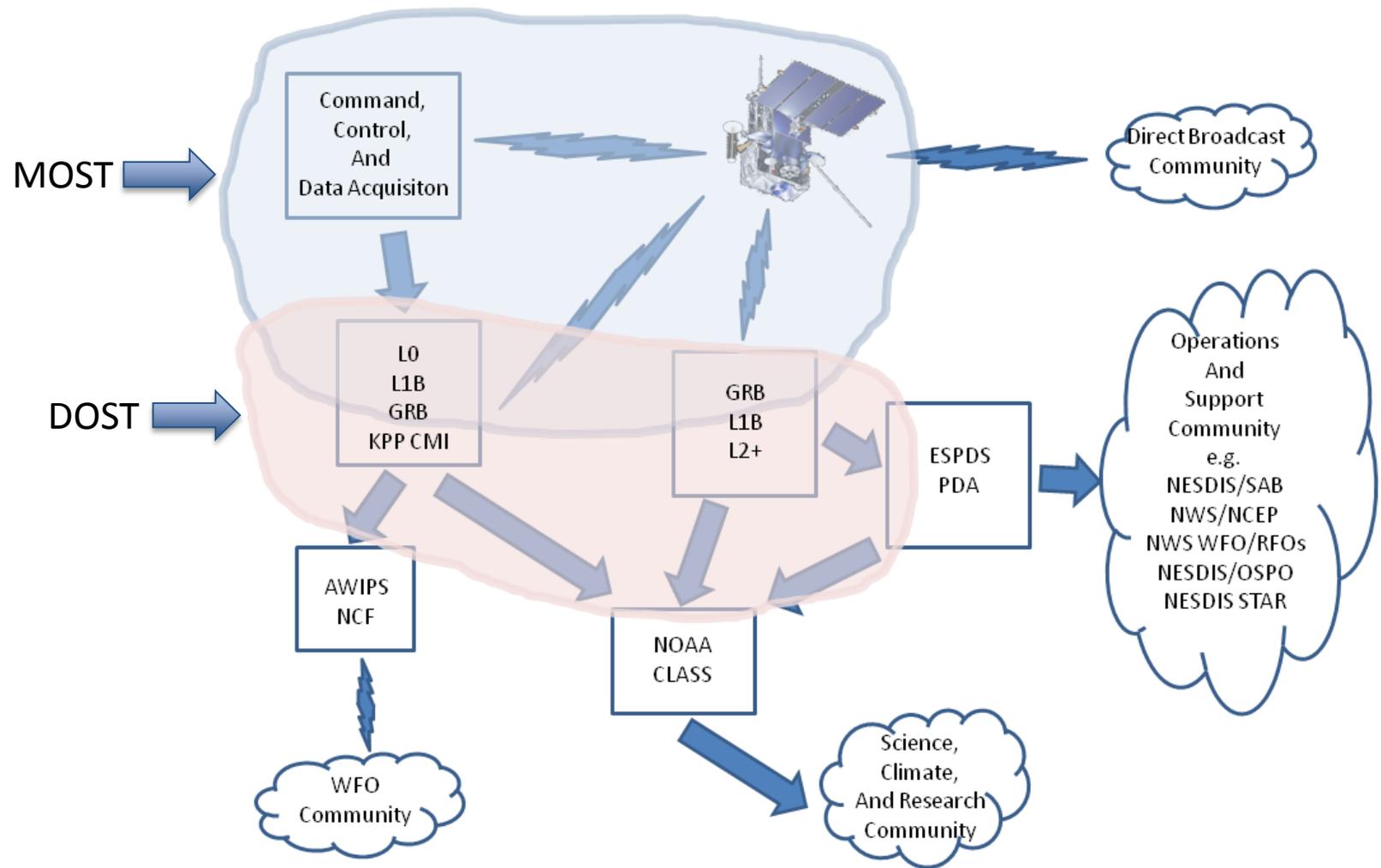


# Functions of the DOM/DOST Team

- Develop product operations and contingency procedures
- Plan and conduct pre-launch tests with external user interfaces
- Participate in PG and PD system acceptance and regression testing
- Plan and conduct Data Operations portions of the Post-Launch Test
- Off-line engineering analysis of PG and PD performance
- Establish an authorized group of initial users of the subscription and ad-hoc query functionality for test purposes
- Coordinate updates to L2+ product algorithms with the Algorithm Working Group (AWG)
- DOM prepares for handover to OSPO for routine product operations
  - Includes help desk preparations
  - Oversees day to day operations of data and products (L1B, L2+)



# Validation Areas of Responsibility





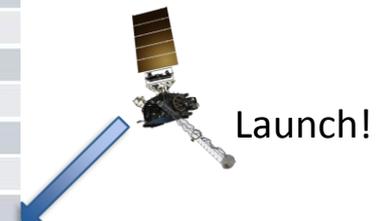
# Objectives Matrix

		MRD Requirement		Owner							
Requirement ID	Objective Number	Description		DOM	MOM	CalVal	Objectives	Objectives	Objectives	Objectives	Objectives
				0	0	0					
ID	Object Number	P417-R-MRD-0070, RM Version, Mission Requirements Document (MRD)		DOM	MOM	CVL					
2	MRD44	3.2.2.1.0-1	The GOES-R system shall position satellites at 75 degrees West longitude and 137 degrees West longitude at geosynchronous altitude during nominal operations. (CCR 01626A)	X	X	X					
3	MRD2081	3.2.2.1.0-2	The GOES-R system shall operate satellites at 89.5 degrees West longitude at geosynchronous altitude for initial satellite checkout. (CCR 01626A)	X	X	X					
4	MRD2082	3.2.2.1.0-3	The GOES-R system shall operate satellites at 105 degrees West longitude at geosynchronous altitude for on-orbit storage. (CCR 01626A)	X	X	X					
12	MRD2105	3.2.2.1.0-11	The GOES-R System shall operate in either on-orbit yaw attitude resulting from Yaw Flips during equinox seasons. (CCR 02115)	X	X	X					
13	MRD2106	3.2.3.0-1	The GOES-R System shall have an availability of 0.83 each month for the KPP at each geosynchronous orbital location, over System lifetime. (CCR 02115)	X	X						
14	MRD2107	3.2.3.0-2	The GOES-R System shall have a monthly availability of 0.98 over mission lifetime for the CONUS region contained in the overlap of both operational coverage areas. (CCR 02115)	X	X						
15	MRD2095	3.2.4.0-1	The GOES-R system shall operate continuously using primary and alternate facilities as defined in Federal Continuity Directive 1 (FCD-1), Annex G, Continuity Facilities, [Applicable Document 41]. (CCR 01609)	X	X						
16	MRD64	3.2.5.0-1	The GOES-R System shall prevent unauthorized use and access. (CCR 01572A)	X	X						
17	MRD68	3.2.6.0-1	The GOES-R system shall meet the system safety requirements specified in Ground Segment Project, G417-R-GSMAR-0068, Advanced Baseline Imager, 417-R-ABIMAR-0012, Spacecraft, 417-R-SCMAR-0011, and Instrument, 417-R-IMAR-0039, Mission Assurance Requirements Documents [Applicable Documents 33, 36, 34, 35]. (CCR 1571A)	X	X						
18	MRD2091	3.2.6.0-2	The GOES-R System shall comply with Section 508 of the Rehabilitation Act (29 USC 749d) as amended [Applicable Document 46]. (CCR 01609)	X	X						
			The GOES-R System shall preclude a single credible failure from inducing mission failure.								



# DOST Schedule

Component	Task	GSP IMS Complete Date
GSP	Develop Validation Objective	5/9/2012
GSP	Publish Validation Objective	5/10/2012
GSP	Validation Objective Review	7/27/2012
GSP	Develop Test Plan	7/5/2013
GSP	Publish Test Plan	7/8/2013
GSP	Form DOST	8/15/2013
GSP	DOT 1: Develop Procedures	6/4/2014
GSP	DOT 1: Publish Procedures	6/4/2014
GSP	DOT 1: TRR	7/4/2014
GSP	DOT 1: Execution	8/12/2014
GSP	DOT 1: Prepare Report	10/29/2014
GSP	DOT 1: Release Report	10/29/2014
GSP	DOT 2: Develop Draft Procedures	6/4/2014
GSP	DOT 2: Publish Draft Procedures	6/4/2014
GSP	DOT 2: Modify Procedure	11/26/2014
GSP	DOT 2: Publish Final Procedures	11/27/2014
GSP	DOT 2: TRR	12/12/2014
GSP	DOT 2: Execution	1/9/2015
GSP	DOT 2: Prepare Report	2/9/2015
GSP	DOT 2: Release Report	2/10/2015
GSP	PLPT: Develop Draft Procedures	6/4/2014
GSP	PLPT: Publish Procedures	6/4/2014
GSP	PLPT: Modify Procedure	7/6/2015
GSP	PLPT: Publish Final Procedures	7/6/2015
GSP	PLPT: TRR	7/7/2015
GSP	PLPT: Execution	9/8/2015
GSP	PLPT: Prepare Report	10/5/2015
GSP	PLPT: Release Report	10/6/2015





# GOES-R User Readiness Plan Tenets

- Ensures users are aware of the changes and updates being made to the GOES-R mission
- Training is readily available for the products being developed
- Participation and feedback for the various user readiness activities are well documented
- All questions from users are addressed by the GPO
- GRB users are aware of the needed changes for their ground station
- All user readiness information is easily attainable



# GOES-R User Readiness Plan User System

## User System Readiness Process/Criteria

This activity feeds into the overall User Readiness Plan in that it captures issues unique to the systems themselves, and allows those issues to be addressed via the appropriate methodologies described within this plan (i.e., the Proving Ground, Training, and Communication). To assess user system readiness for each system, the GSP Science Office asked stakeholders and representatives of the four user systems a series of questions, including:

- Who are the stakeholders and how are they currently engaged?
- What tools, data, and training are needed to ensure user system readiness?
- What are the relevant test and verification plans to user systems readiness?
- What is the schedule, cost, and staffing required ensuring user system readiness?

There is a lot more to do for user system readiness.



# GOES-R Operational User Readiness Awareness

- Formats
  - NetCDF is the primary format provided
  - McIDAS format will be provided (ADDE) through PDA, not GOES-R
  - GRIB and BUFR will not be provided out of GOES-R, but could it be provided elsewhere (PDA, Users themselves?)
  - GVAR to GRB, software/equipment migration, GRB specifications and schedule releases, simulation/testing schedules and training for direct readout users will be provided
- Antenna Readiness – Direct Readout Community (GRB, HRIT, EMWIN)
  - GRB Simulator – getting industry ready to receive GRB and build receivers
  - International Users may not have access to simulator due to ITAR rules, this needs more investigation as to what we can release.
  - NWS Users need to consider upgrading their current receiving antennas, OSPO has had some discussion, but more is needed.



# GRB Simulator Planning and Distribution

- **The GRB Simulator will allow on-site testing of user ingest and data handling systems, aka GRB field terminal sites, to Industry**
  - Simulates GRB downlink functionality.
  - Harris building 5 GRB Simulators, one stays back for testing
  - Available in May 2013
  - Specifications to be provided soon, after GOES-R reviews and ITAR release
- **Key Capabilities and Features**
  - Transportable
    - Fully self contained
    - Configurable hardware units
    - About  $\frac{3}{4}$  size a refrigerator
  - Harris handling logistics of distribution, refreshing, and shipping
  - NOAA/NESDIS/OSPO/SPSD handling who gets one and when



# Summary

- The DOM will create the DOST in 2013 and be a central focus of GOES-R Data and Product Distribution in the GOES-R era
- Validation testing will occur pre and post launch by the DOST and fully test the data and product system
- GOES-R data products will be available using new product distribution, formats, and access technologies that users need to be ready to receive in going from GVAR to GRB.
- If PDA goes down there will not be any products generated, single point of failure
- User Readiness will be an important task in making sure Users are actually ready for these new formats, features, data volume, and products and know where to get information when they need it.
- GRB Simulators will be available to industry. The times they have to use them will be controlled by NESDIS. Logistics handled by Harris