



GOES-R is the next generation of GOES satellites that will provide a major improvement in quality, quantity, and timeliness of data collected.

GOES-R Program Calibration and Validation (Cal/Val)

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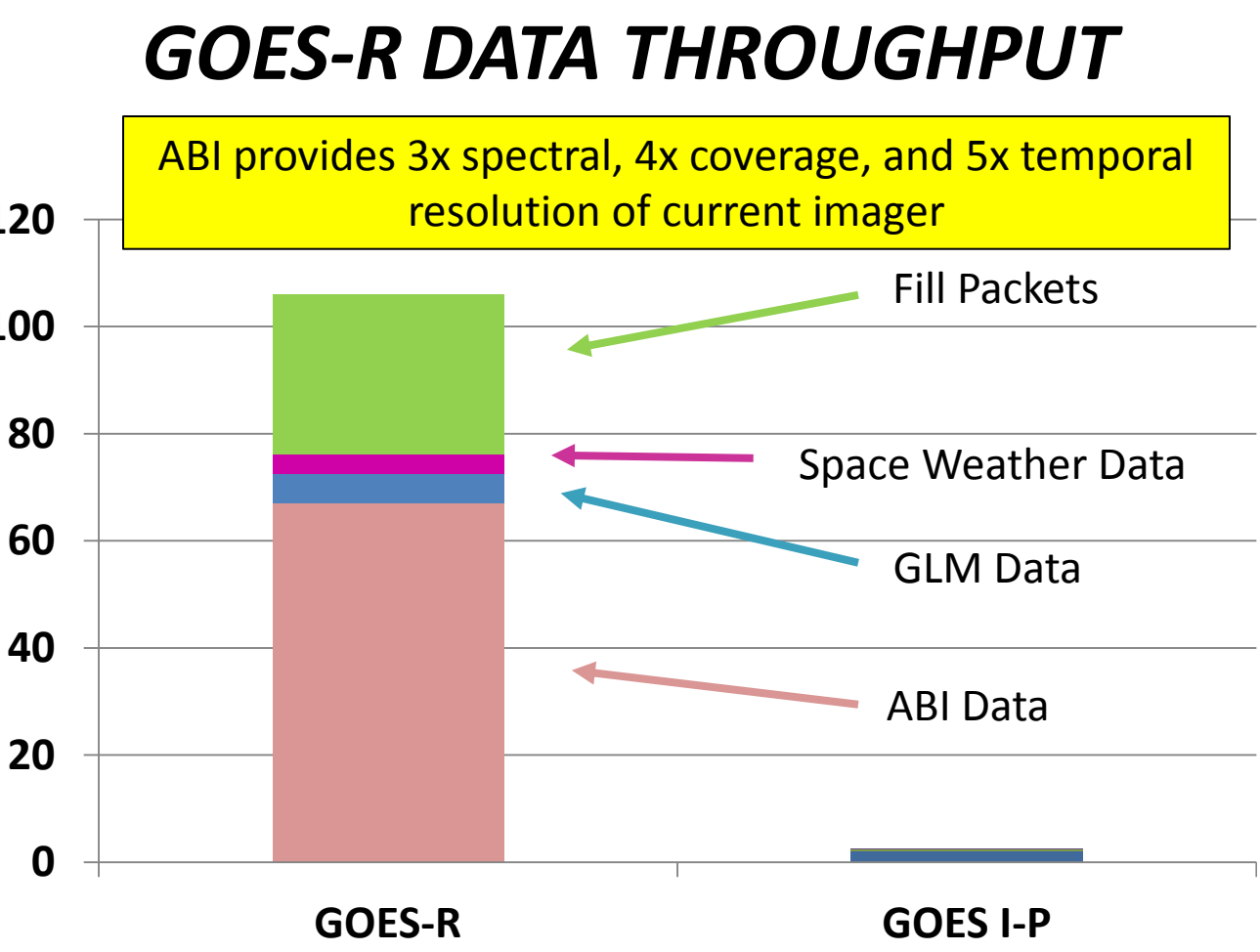
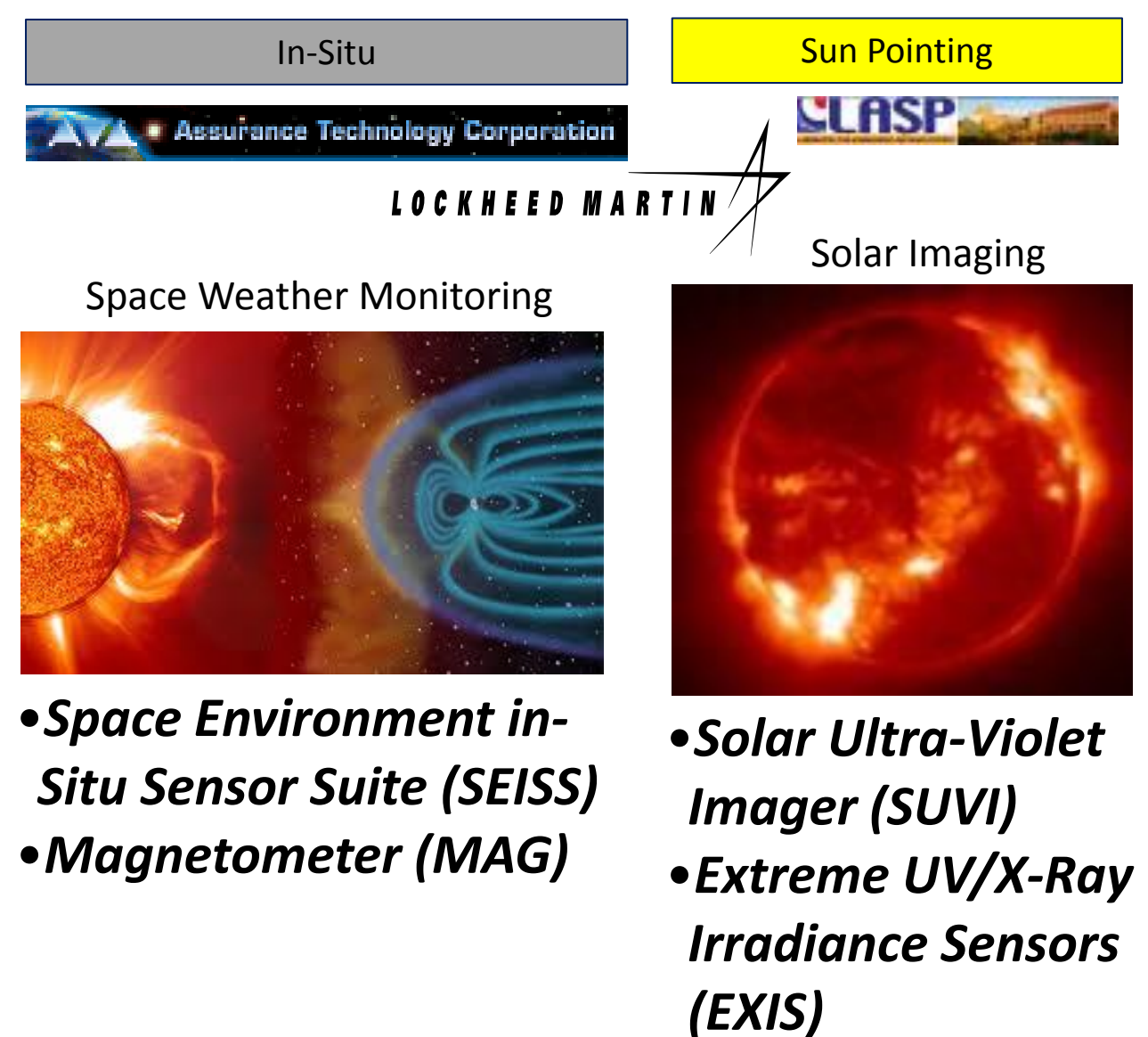
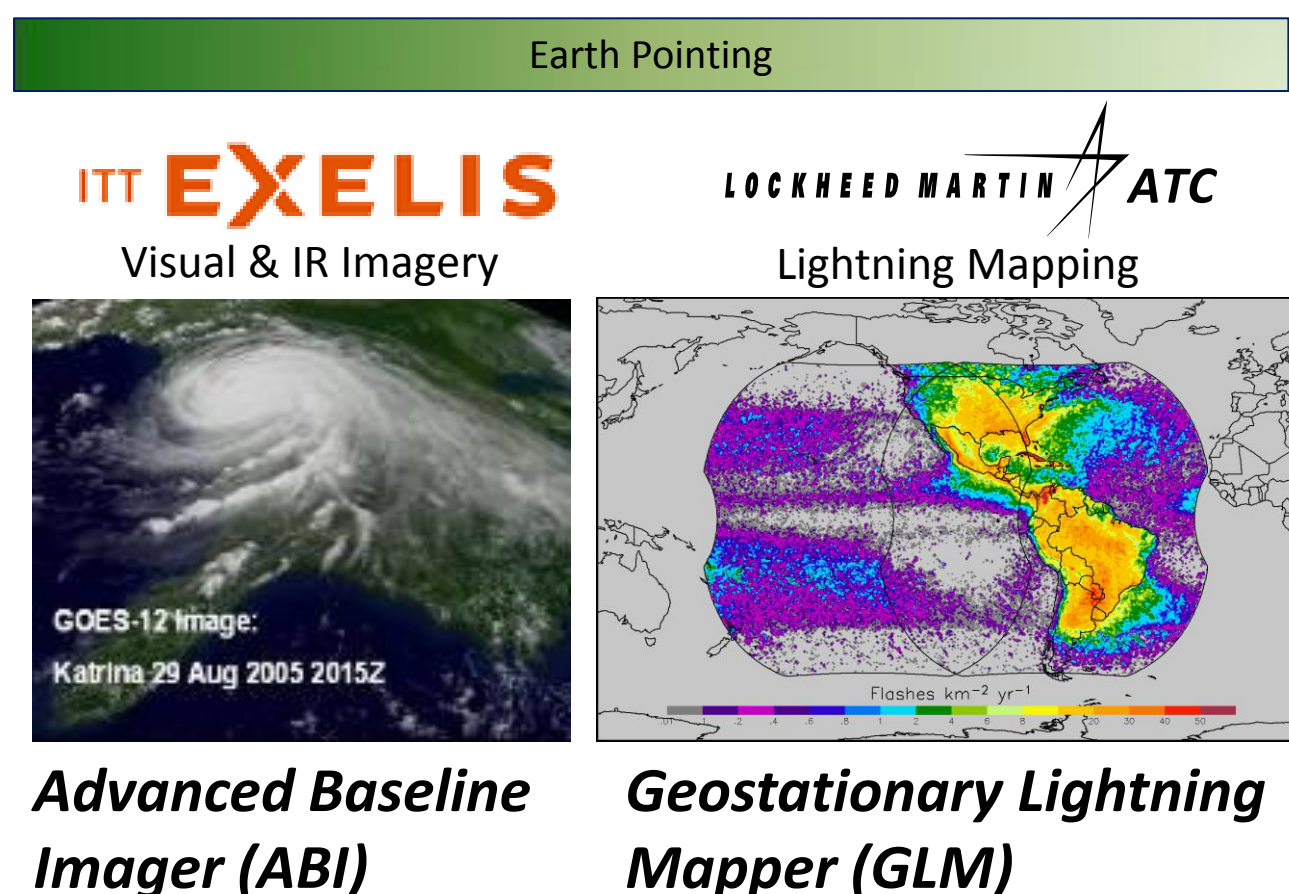
NOAA/NESDIS/GOES-R (1), NASA (2), NOAA/NESDIS/STAR (3)

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Calibration is applied to GOES-R raw instrument data to transform them into L1b measurements ... the fundamental building blocks for all L2+ products.

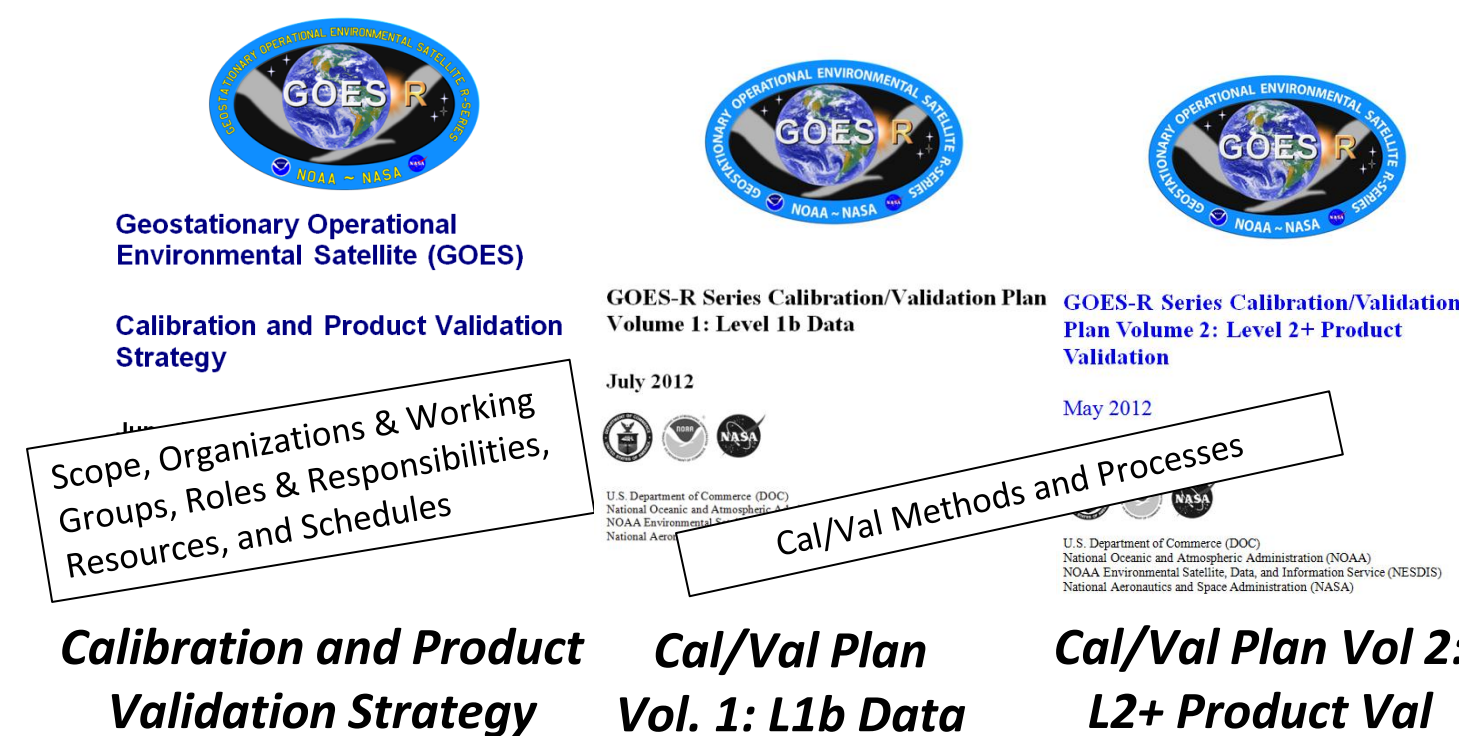
Validation provides user confidence that GOES-R data can be used for their intended purpose, e.g., weather forecasting or numerical weather prediction.

GOES-R INSTRUMENTS

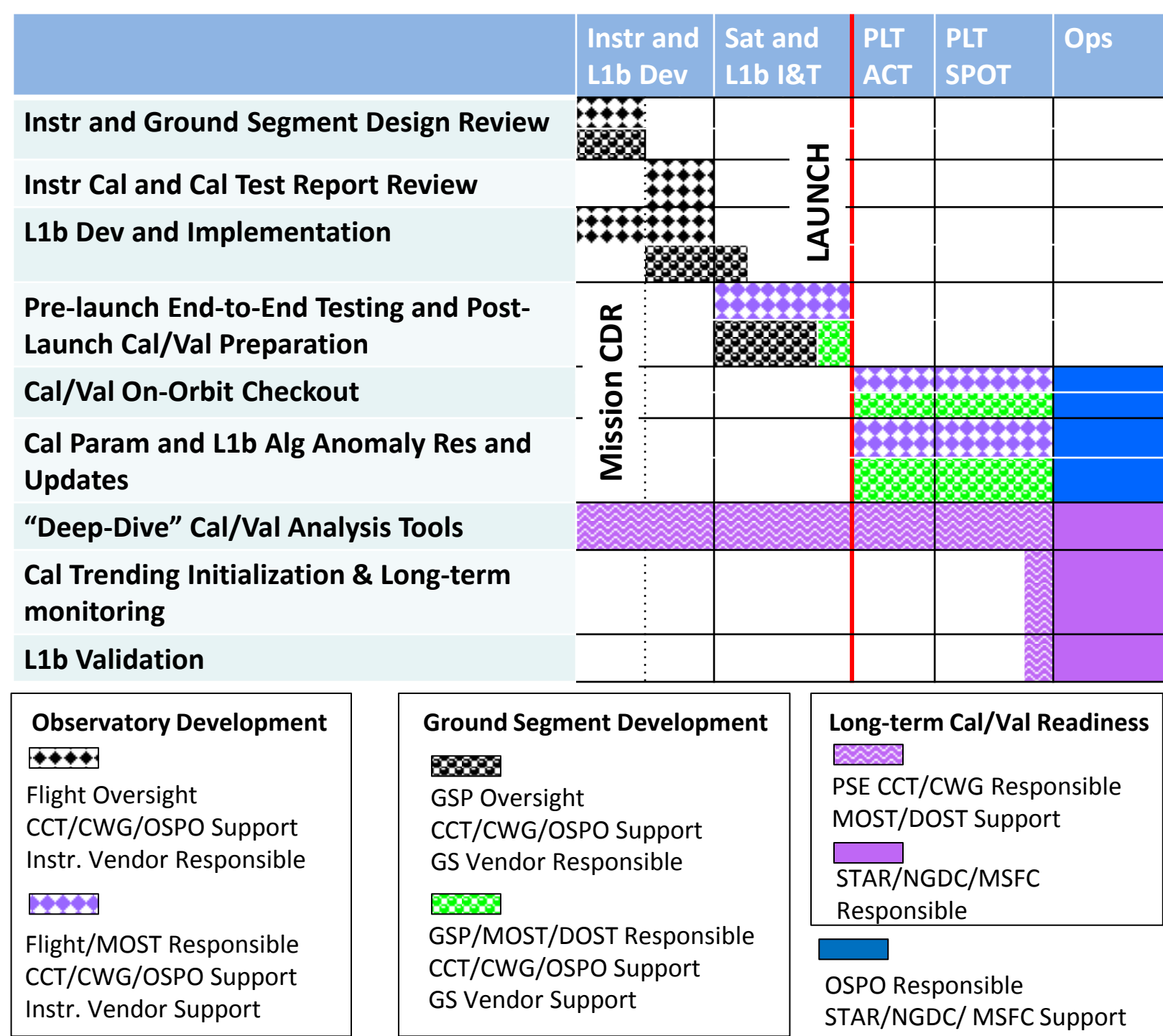


- ### GOES-R PRODUCTS
- Level 1b (L1b) Products (9)
 - Level 2+ (L2+) Products [from ABI (24) & from GLM (1)]

GOES-R PROGRAM-LEVEL CAL/VAL PLANS, COLLABORATORS, AND ACTIVITIES

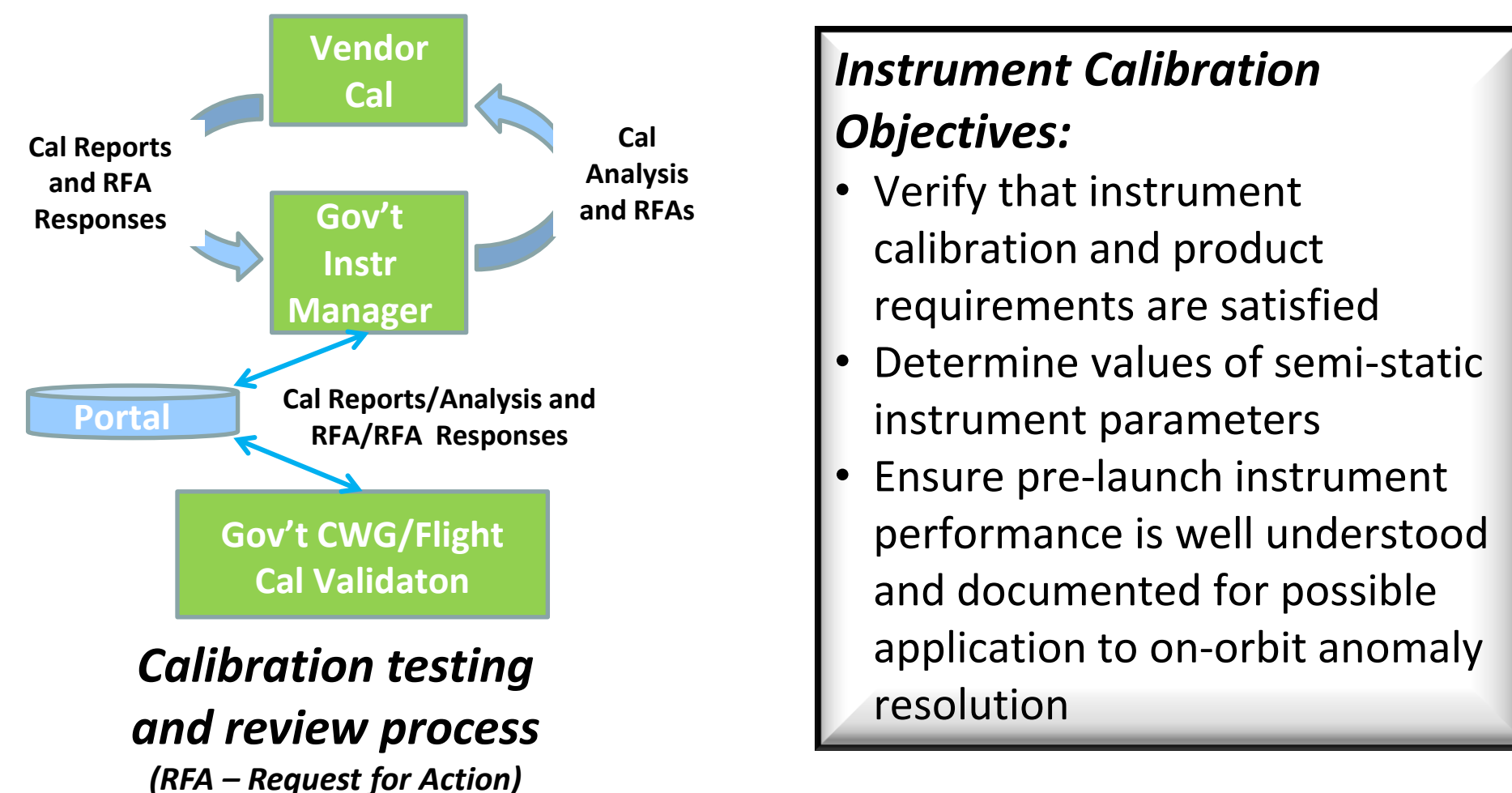


- ### GOES-R Cal/Val Collaborators
- Flight Project - Gov't oversight of SC/Instr. Development
 - SC/Instr Vendor - SC/Instr. Development
 - Ground Segment (GS) Project (GSP) - Gov't oversight of GS Development
 - GS Vendor - GS Development
 - Mission Ops Support Team (MOST) - Gov't SC/Instr/GS Testing
 - Data Ops Support Team (DOST) - Gov't GS Testing
 - Cal Coordination Team (CCT) - Gov't Cal/L1b Val Management
 - Cal Working Group (CWG) - Gov't Cal/L1b Val Technical Support
 - Algorithm Working Group (AWG) - L2+ Product Dev and V&V
 - NESDIS Office of Satellite and Product Operations (OSPO) - Ops Support to Cal/Val



Major GOES-R Cal/Val-related Activities in Each Mission Phase
[Dev - Development; I&T - Integration and Test; PLT ACT - Post-launch Testing (PLT) Activation and Characterization Test; PLT SPOT - PLT System Performance Operational Test; Ops - Operations]

PRE-LAUNCH INSTRUMENT CALIBRATION



Radiometric Characterization & Calibration	Spectral Response	Image Navigation & Registration	Spatial Resolution & Response
<ul style="list-style-type: none">System linearity and dynamic rangeSignal-to-Noise, NEDN, and Coherent NoisePixel-to-pixel, swath-to-swath, channel-to-channel-, image-to-image, and blackbody calibration-to-calibration repeatabilityIrradiance to radiance transfer (VNIR)External/Internal calibration target comparison (TIR)Polarization (VNIR)Channel-to-channel and within channel optical cross talkElectronic cross talkBloomingQuantization step sizeHot, marginal and dead pixels	<ul style="list-style-type: none">Spectral response function (SRF) envelopeSRF uniformity over the focal plane detector arrayOut-of-band responseSRF uncertaintyInference of possible SRF shiftsConsistency between system-level and integrated component-level SRF	<ul style="list-style-type: none">Navigation (including star sensing)Frame-to-frame, within frame, swath-to-swath, and channel-to-channel registration	<ul style="list-style-type: none">System modulation transfer functionSpatial response uniformity (e.g., response vs. scan angle)Ringing from a sharp edgeNear field scatterFar field scatterGhostingPointing knowledge

ABI vendor instrument calibration testing

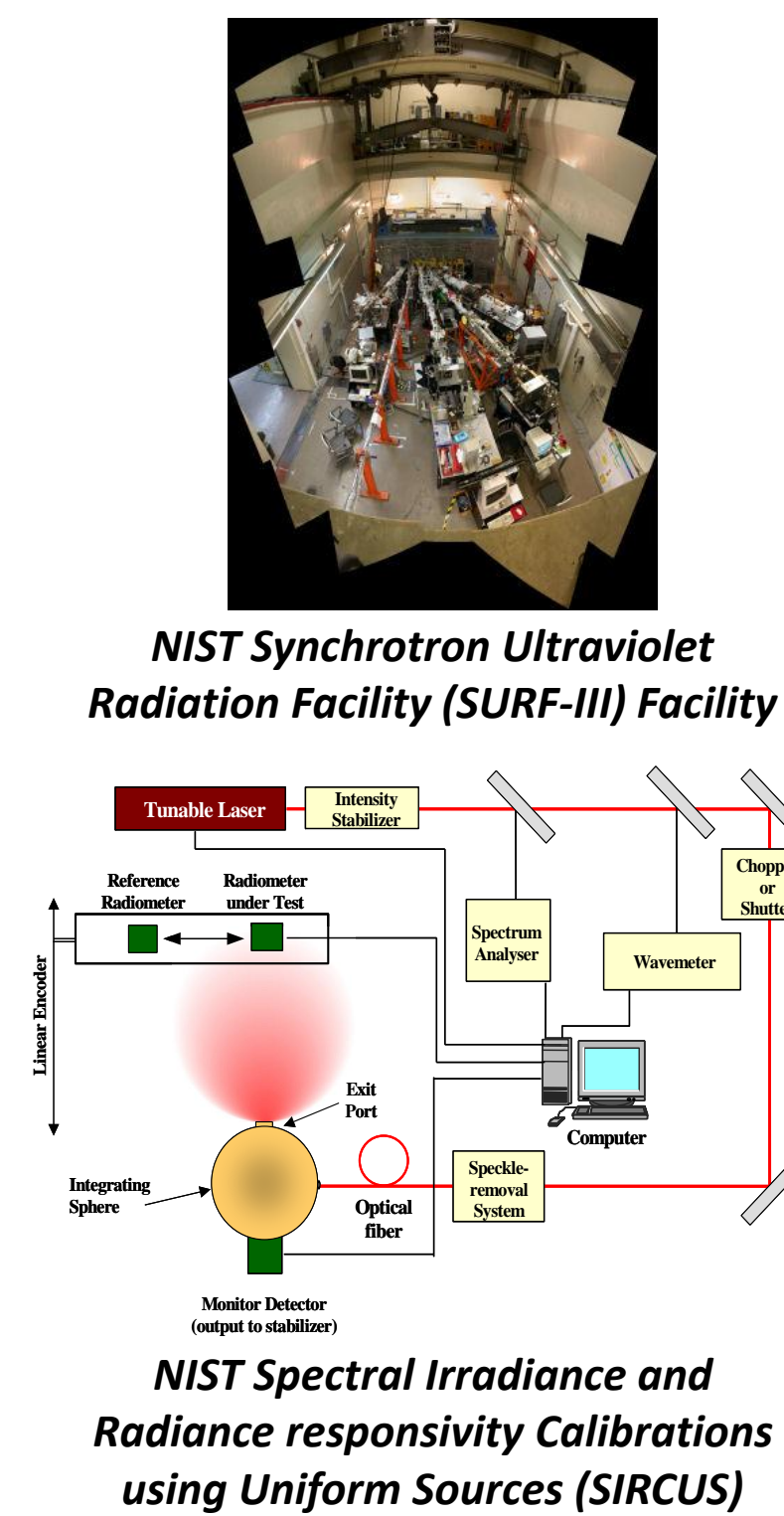
Government Validation of Cal Testing

Flight Project and Calibration Working Group

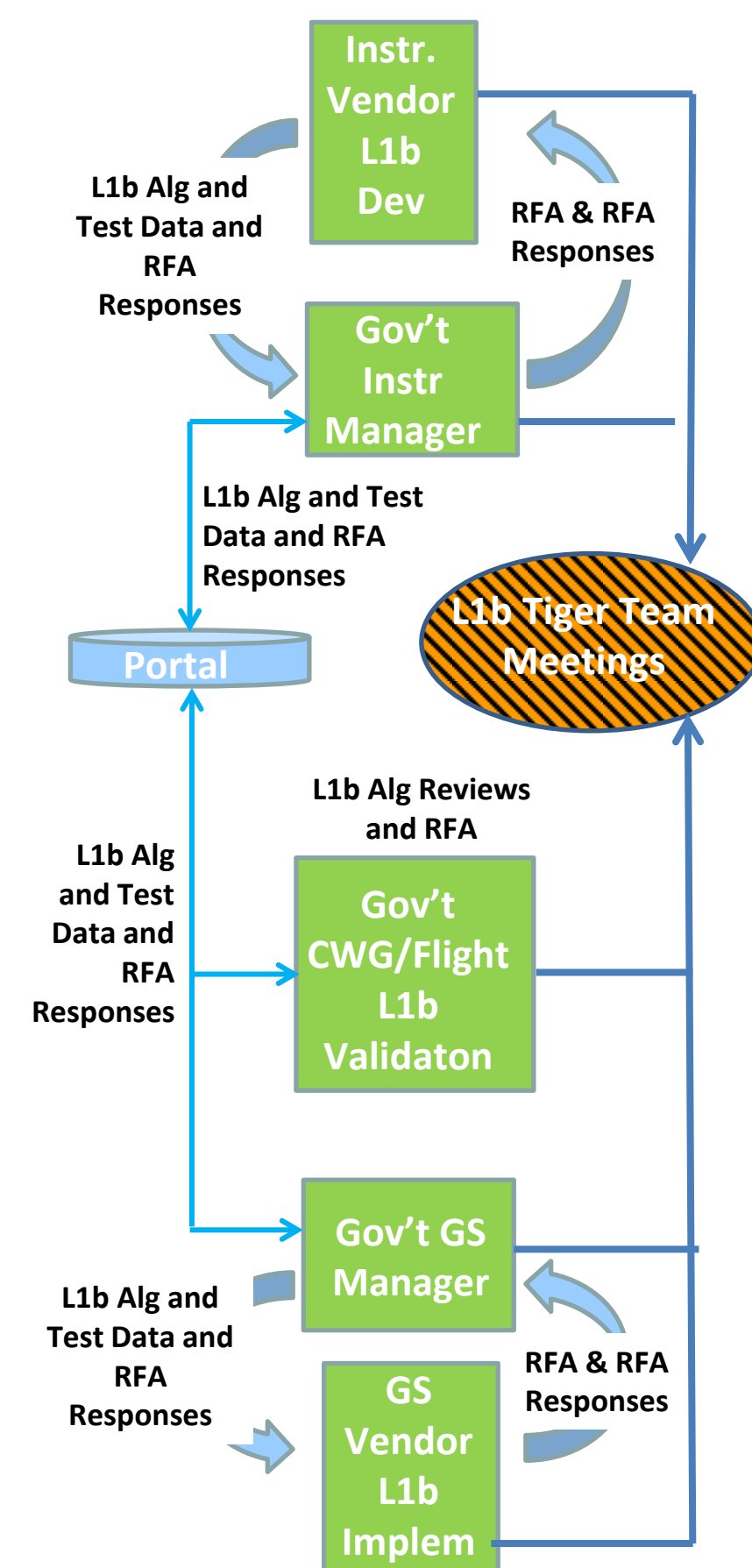
- Provide feedback regarding vendor cal test plans and readiness
- Analyze vendor cal test reports

US National Institute of Standards and Technology (NIST)

- Support planning for *Système international d'unités* (International System of Units - SI) traceable calibrations of ABI and EXIS
- Review vendor cal plans and test setups
- Establish SI-traceability to primary standards through NIST supported testing, e.g.,
 - Validation of ABI filter SRF
 - Characterization of ABI end-to-end spectral response using Traveling SIRCUS
 - Characterization of ABI vendor's integration spheres at FASCAL2
 - Characterization of external blackbody via thermal transfer radiometer (TXR)
 - Validation of the ABI vendor's FEL lamps
 - End-to-end calibrations of EXIS at SURF-III/Beamline 2



PRE-LAUNCH L1B ALGORITHM DEVELOPMENT

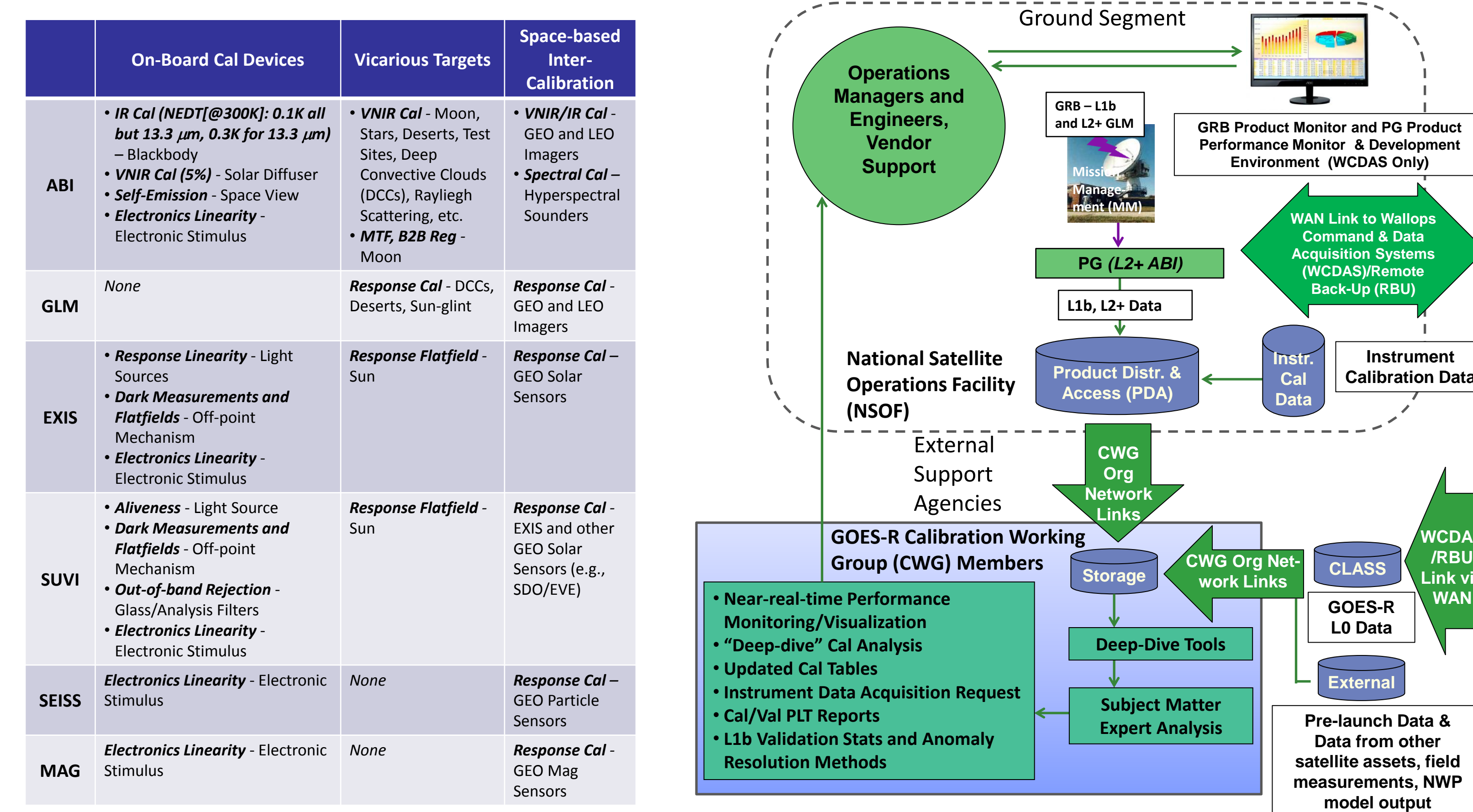


L1b algorithm evolution process (RFA - Request for Action)

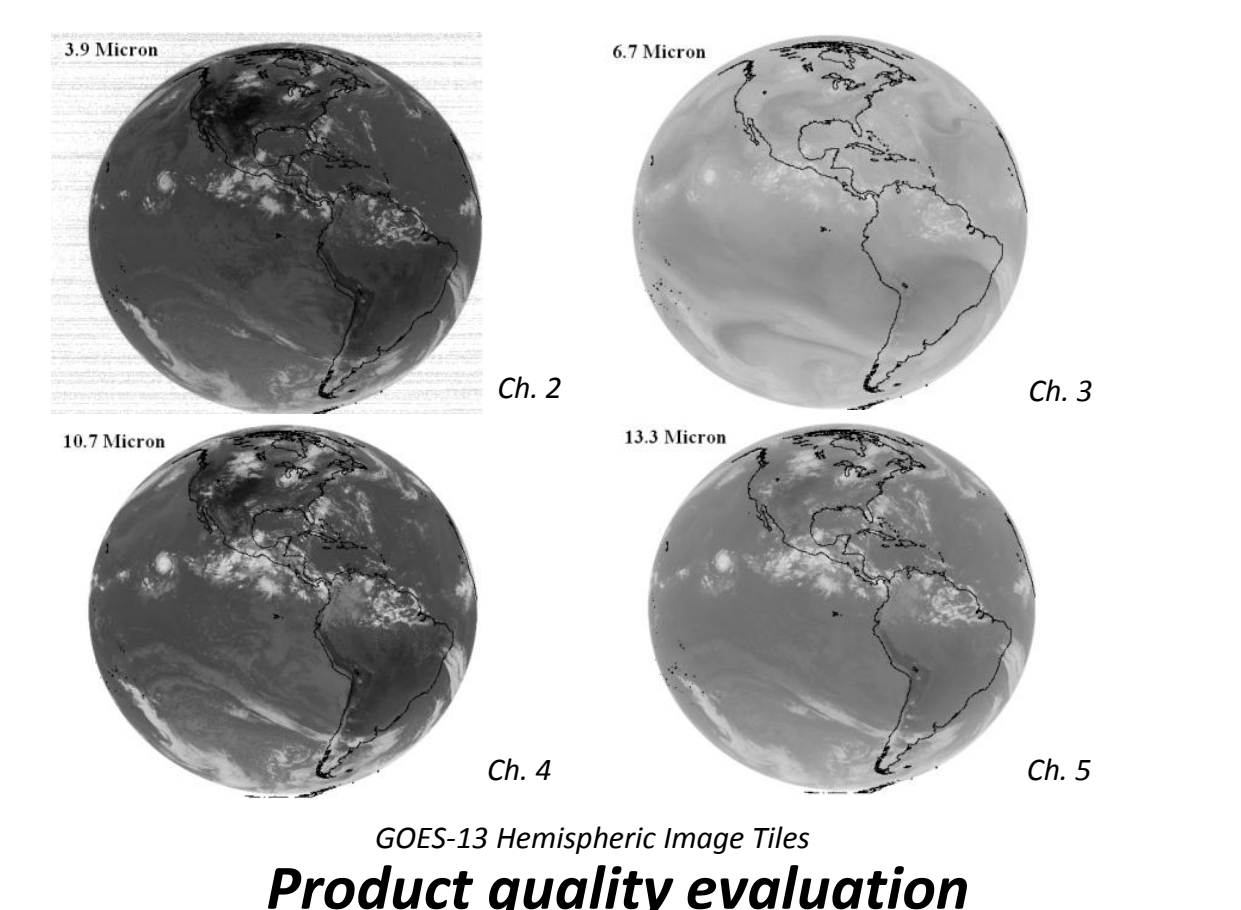
L1b Tiger Team Mandate
Proactively identify and mitigate risks associated with implementing GFP L1b algorithms

- ### Key L1b algorithm quality assurance activities
- Evaluate L1b algorithm completeness
 - Identify and track L1b algorithm issues to be resolved by the developer
 - Assess fidelity of L1b algorithm implementation by the GS vendor
 - Develop instrument calibration data and product metadata definitions

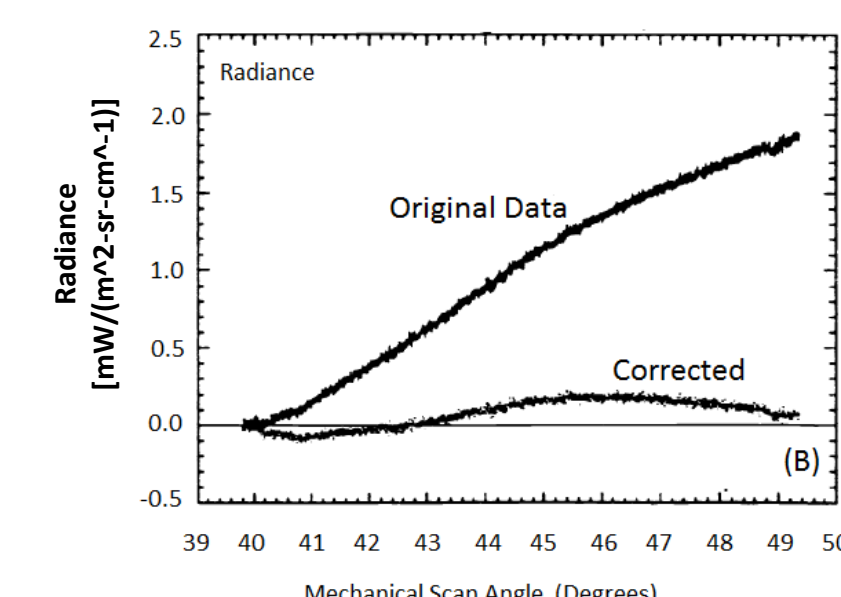
POST-LAUNCH CAL/VAL



GOES-R observatory on-orbit cal/val assets



Product quality evaluation



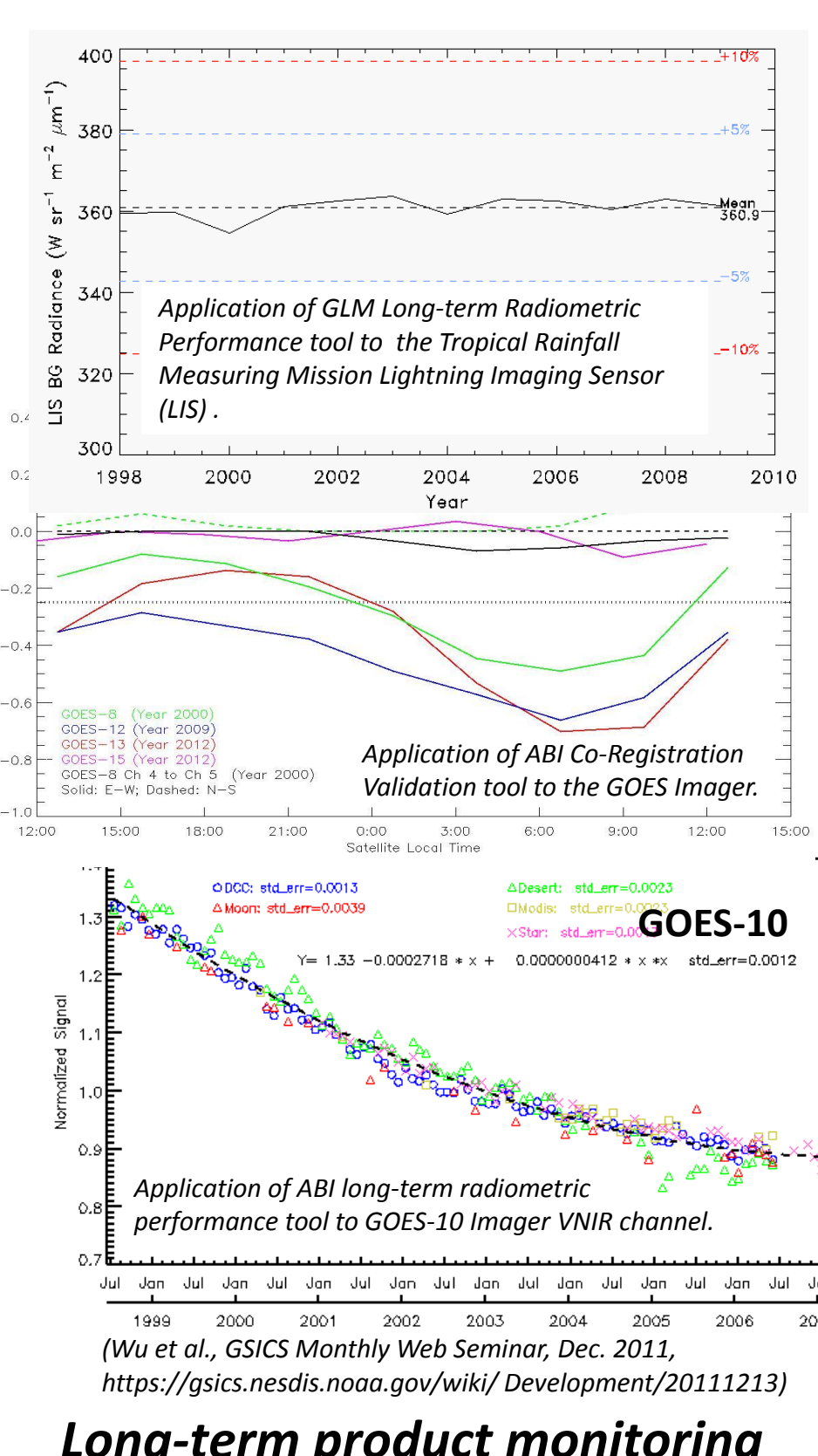
Calibration input parameter evaluation

GOES-R cal/val infrastructure

On-board calibration system evaluation



On-orbit calibration and L1b anomaly resolution



Long-term product monitoring