

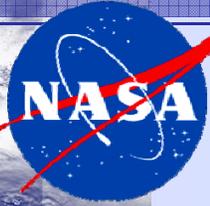
# GSFC Safety and Mission Assurance Organization

Michael P. Kelly

Institutional Support Office, Chief  
Safety and Mission Assurance Directorate,  
Goddard Space Flight Center

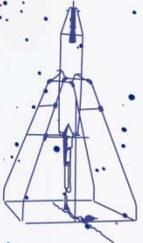
February 11, 2010

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# Agenda

- NASA GSFC Background
  - Facilities Overview
  - Mission Portfolio
  - NASA GSFC Organization
- Safety & Mission Assurance Directorate
- The Role of SMA-D and the Technical Authority
- GSFC Mission Assurance Requirements
- GSFC Systems Review Office (SRO)
- GSFC Supply Chain Management Program
- GSFC ISO9001 / AS9100 Status Brief





# NASA GSFC Facilities

Goddard Space Flight Center, Maryland  
Wallops Flight Facility, Virginia  
IV&V Facility, West Virginia  
Goddard Institute for Space Studies, New York  
White Sands Ground Station, New Mexico



GSFC



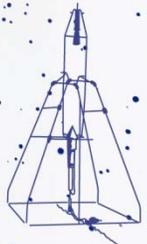
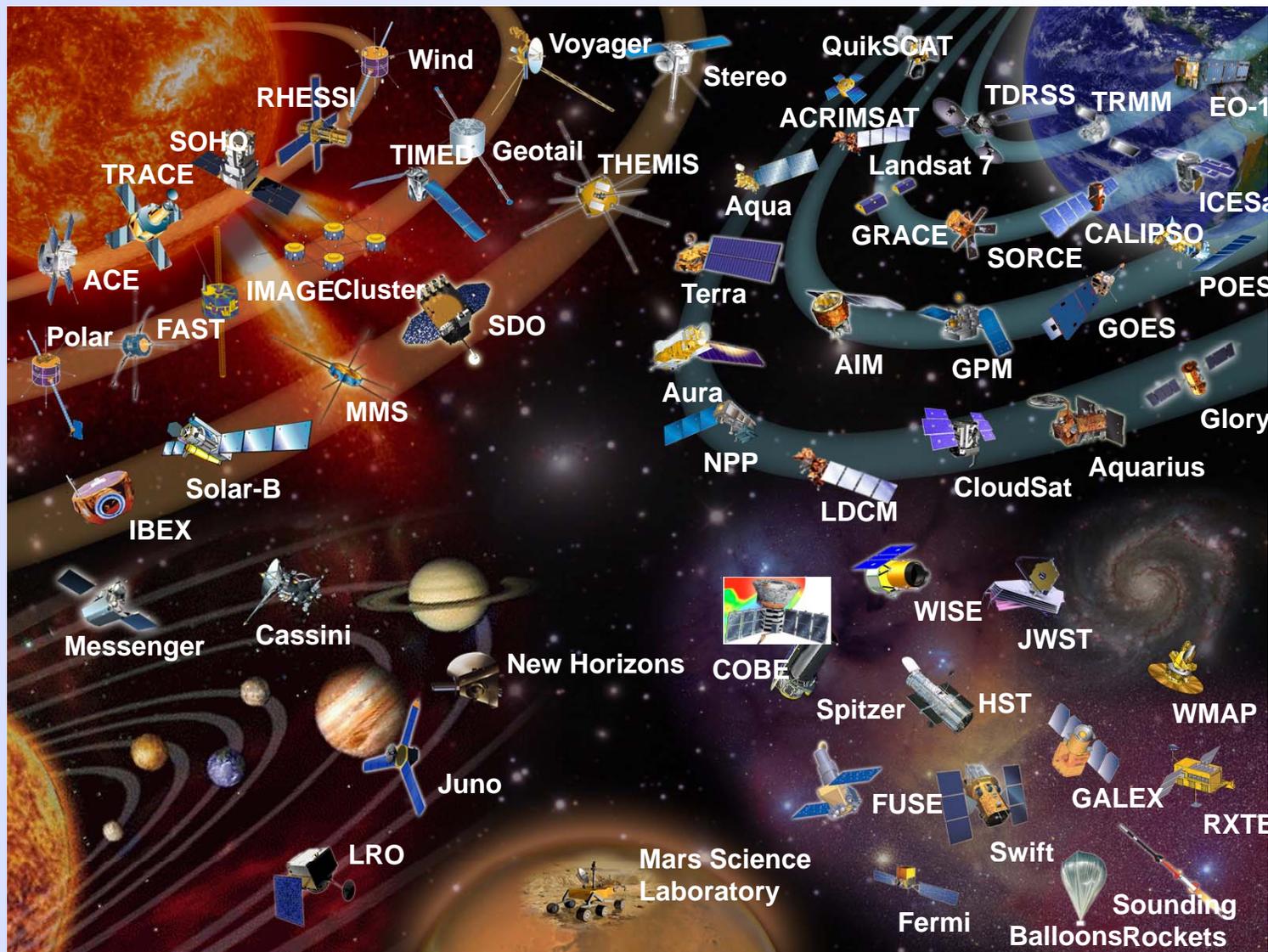
GISS



IV&V



# NASA GSFC Diverse Mission Portfolio



# SMA-D Supported Flight Missions/Instruments (In Progress)

## MISSIONs

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• SDO</li> <li>• ELC</li> <li>• Glory</li> <li>• GOES-P</li> <li>• NPP</li> </ul>  | <ul style="list-style-type: none"> <li>• MMS</li> <li>• Robotics for Space Station</li> <li>• GEMS</li> <li>• SMAP</li> <li>• IceSAT II</li> </ul>                     |
| <ul style="list-style-type: none"> <li>• LADEE</li> <li>• RBSP</li> <li>• TDRS-K</li> <li>• LDCM</li> <li>• TDRS-L</li> <li>• GPM core</li> <li>• JWST S/C</li> </ul> | <ul style="list-style-type: none"> <li>• MAVEN</li> <li>• Osiris-Rex</li> <li>• VRO</li> <li>• JDEM</li> <li>• Astro-H</li> <li>• DESDynI</li> <li>• Discvr</li> </ul> |

## INSTRUMENTs

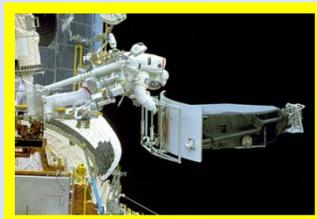
- Metop Instruments
- SAM
- TIRS
- JWST ISIM
- TSIS
- Atlas



NASA

# SMA-D Supported Launches in 2009/2010

HST SM-4 5/09



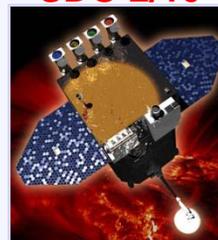
LRO 6/09



ELC 11/09



SDO 2/10



GOES-P 3/10

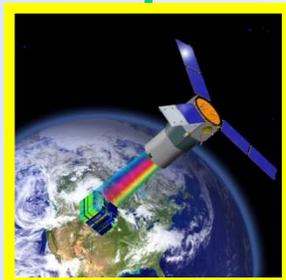


2009

2010



NOAA N'  
2/09



TacSat-3  
5/09



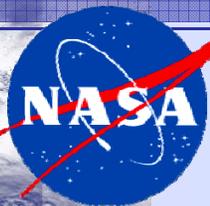
GOES-O  
6/09



GLORY 10/10

Launched Successfully

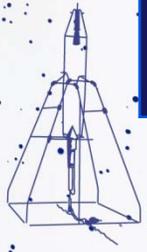
GODDARD SPACE FLIGHT CENTER

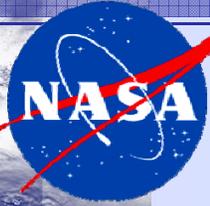


# NASA GSFC Organization

## OFFICE OF THE DIRECTOR

Director - R. Strain  
 Deputy Director - A. Obenschain  
 Deputy Director for Science & Technology – *O. Figueroa*  
 Associate Director - N. Abell  
 Assistant Director for Safety and Security - J. Bruner  
 Assistant Director for Advanced Concepts - B. Seery  
 Government and Community Relations Manager - D. Hollebeke  
 Special Assistant for Diversity - S. Wong





# Safety and Mission Assurance Directorate (Code 300)

**Pam Myers**, Secretary to the Director  
**Gilser Nash**, Secretary to the Deputy Director

**Marcus Watkins**, Director  
**Maria So**, Deputy Director  
**Eric Isaac**, Associate Director  
**Jesse Leitner**, Chief SMA Engineer

**George Alcorn**, Assistant Director for Technical Standards Excellence  
**Joe Wonsever**, Chief Technical Assessments Engineer  
**Pradeep Sinha**, Assistant to the Director

**Sanjeev Sharma**, Information Technology Manager

Directorate Resource Management Office (300.1)  
**Gale Fleming** (Directorate Resources Mgr)

EEE Parts/Workmanship Group  
**Michael Sampson**, NASA EEE Parts Assurance Group Program Manager  
**Jeannette Plante**, Electronics Packaging Engineer

System Review Office (301)  
**Mark Goans** (Chief)

Institutional Support Office (302)  
**Michael Kelly** (Chief)

Resource Analysis Office (305)  
**Cynthia Fryer** (Chief)

Mission Support Division (320)  
**Michael Delmont** (Chief)  
**Owen Gruelich** (Deputy Chief)

Occupational Safety & Health Division (350)  
**Armando Lopez** (Chief)

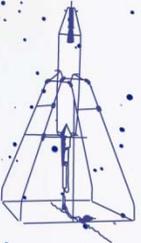
**Karen Fisher**  
Constellation Support

Systems Safety Branch (321)  
**Bo Lewis** (Branch Chief)

Reliability & Risk Analysis Branch (322)  
**Anthony Diventi** (Branch Chief)

Mission Assurance Branch (323)  
**Robert Savage** (Branch Chief)

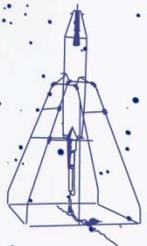
Institutional Assurance Branch (324)  
**Rob Sticka** (Branch Chief)

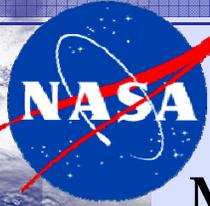


The NASA logo, featuring the word "NASA" in white capital letters on a blue circular background with a red swoosh and a white orbital path.

## Safety & Mission Assurance Directorate Charter

- The Safety and Mission Assurance (SMA) Directorate is responsible for the overall management and implementation of Center policy in the areas of systems safety, mission assurance and management systems. It provides leadership, guidance and technical authority to review Goddard Space Flight Center (GSFC) programs and projects in order to assure and independently verify that these systems meet the Agency's goals for mission success.





# SMA-D Mission and Core Values

## **Mission**

*We provide an independent voice to enable Mission Success*

## **Integrity**

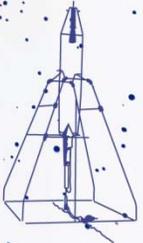
- *We value individual and organizational honesty, consistency and credibility*
- *We ensure independence of thought and are willing to take tough stands*
- *We can be counted on to do what we say*

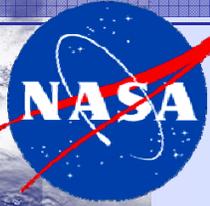
## **Excellence**

- *We are passionate about delivering innovative, value-added services*
- *We consistently exceed our customer's expectations*
- *We proactively seize opportunities to enhance mission success*

## **Collaboration**

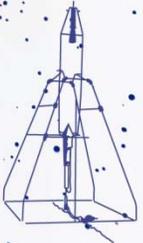
- *We value our diversity and respect each other's contributions – together we are greater than our individual parts*
- *We build partnerships based on trust, respect and responsiveness*
- *We value knowledge sharing and open communication*





# SMA-D Goals

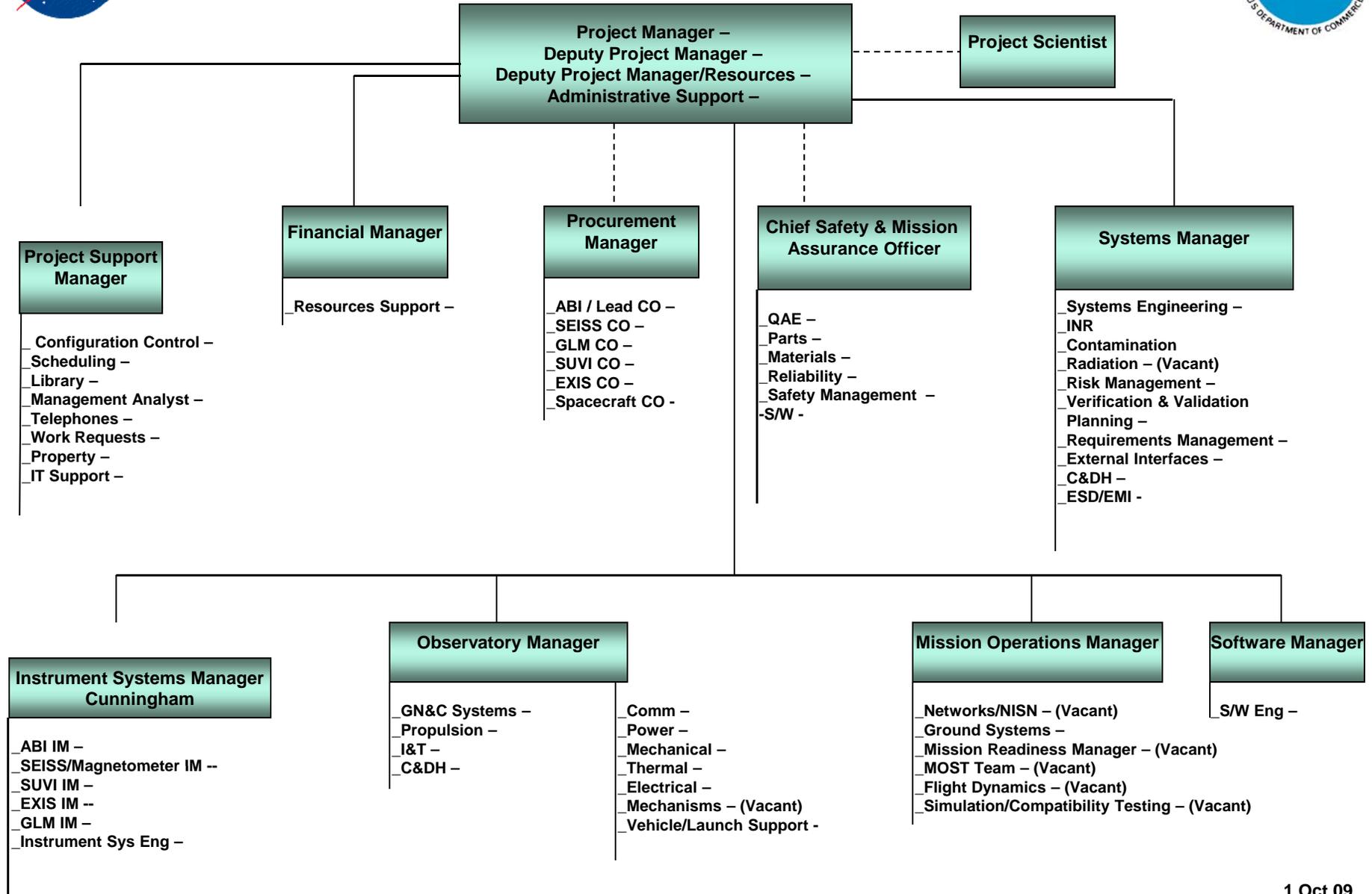
- Goal #1: Attract, develop and retain a diverse, high quality, motivated workforce
- Goal #2: Standardize and improve SMA and GSFC project support processes
- Goal #3: Develop a strong, cohesive SMA organization
- Goal #4: Strengthen external relationships to improve mission success

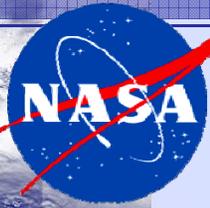




# Goddard Space Flight Center GOES-R FLIGHT PROJECT OFFICE

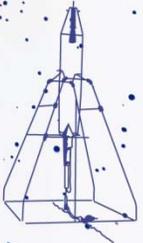
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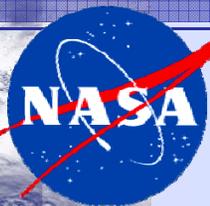




## CSO Responsibilities

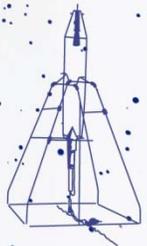
- Responsible for development of Mission Assurance Requirements for the projects
- Ensures implementation of the Mission Assurance Requirements
- Complements the systems review office and systems managers for completion of mission success activities
- Coordinate risks and issues with the Systems Review Manager both before and after major reviews
- Ensures that appropriate oversight of contractors is in place
  - DCMA and in-plant rep letters of delegation
  - NCAS assessments
  - Audits and status reviews
- CSOs signs off on all project problem reports, failure reports, waivers/deviations and design changes.





## Chief Safety & Mission Assurance Officer CSO Functions

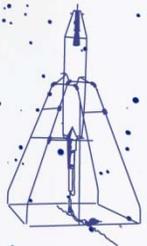
- CSOs assigned to Projects (formerly known as SAMs and FAMs before that)
  - Co-located with Projects
  - Reports to Project Manager (dotted line)
  - Assurance program includes Quality Assurance, S/W assurance, Safety, Reliability, Workmanship, Risk Management, Parts, Materials
- Reports independently back to Code 300
- Works Project full life-cycle from Concept through Launch
- Manages assurance program for both in-house and out-of-house Projects
- Generates and implements Mission Assurance Requirements (MAR)
- Lead for Problem Report/Problem Failure Report (PR/PFR) System
- Lead for Work Order Authorization (WOA) implementation (for in-house missions only)

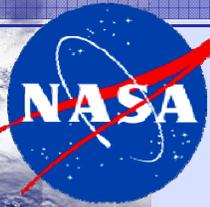




## Chief Safety & Mission Assurance Officer CSO Functions, cont'd

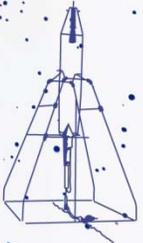
- Member of Parts Control Board. Works closely with Code 562 Parts Engineers.
- Implements Government-Industry Data Exchange Program (GIDEP) compliance and dispositions
- Works with Code 541 Materials to determine acceptability of printed wiring boards by coupon evaluation
- Ensures parts and materials lists are thoroughly reviewed and acceptable for use.
- Coordinates radiation requirements and implementation with Code 561 (Radiation Effects)
- Implements Workmanship Standards such as soldering, cabling, harnessing, conformal coating

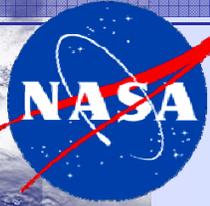




## Chief Safety & Mission Assurance Officer CSO Functions, cont'd

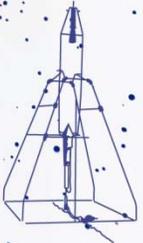
- Voting member of CCB and risk management board
- Conduct audits/assessments at hardware developers (and provide follow-up). Responsible for determining mandatory inspection points
- Support in resolution of hardware/software problems
- Member of Source Evaluation Boards
- Member of Senior Staff
- Interface for all Printed Wiring Board (PWB) coupons
- Point of contact for all manpower in Code 300
- Ensure LOD and NCAS task order are written and followed to support the project.

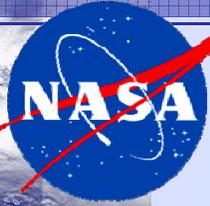




## Chief Safety & Mission Assurance Officer CSO Functions, cont'd

- CSO has an independent reporting chain to the GSFC Center Director.
- Attendance and participation at all major reviews
- Provide monthly presentations to Code 300 Management
- Provide presentations to Project/Program Management as required
- Presents at the Safety and Mission Success Review (SMSR) to Headquarters
- The Mission Assurance Team supports the Program and Project Offices in their daily operations. However, if there are conflicting opinions it is the CSO's responsibility to report those disagreements to NASA management.

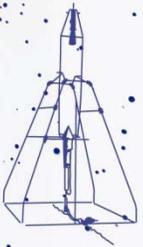


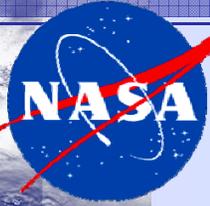


# Chief Safety & Mission Assurance Officer

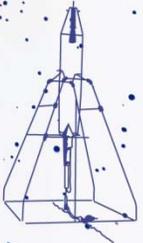
## CSO Functions, cont'd

- Generally the CSO is co-located with the project office, to provide the most efficient access to the project manager and his staff. It is desirable to have safety and reliability personnel co-located there as well.
- CSO must be a good communicator and understand where support is needed and keep the Project in the loop.
- CSO walks a fine line between supporting the Project and remaining an independent entity.
- Works with Systems Safety Engineers to implement project safety program
- Works with Reliability engineering to implement project reliability program



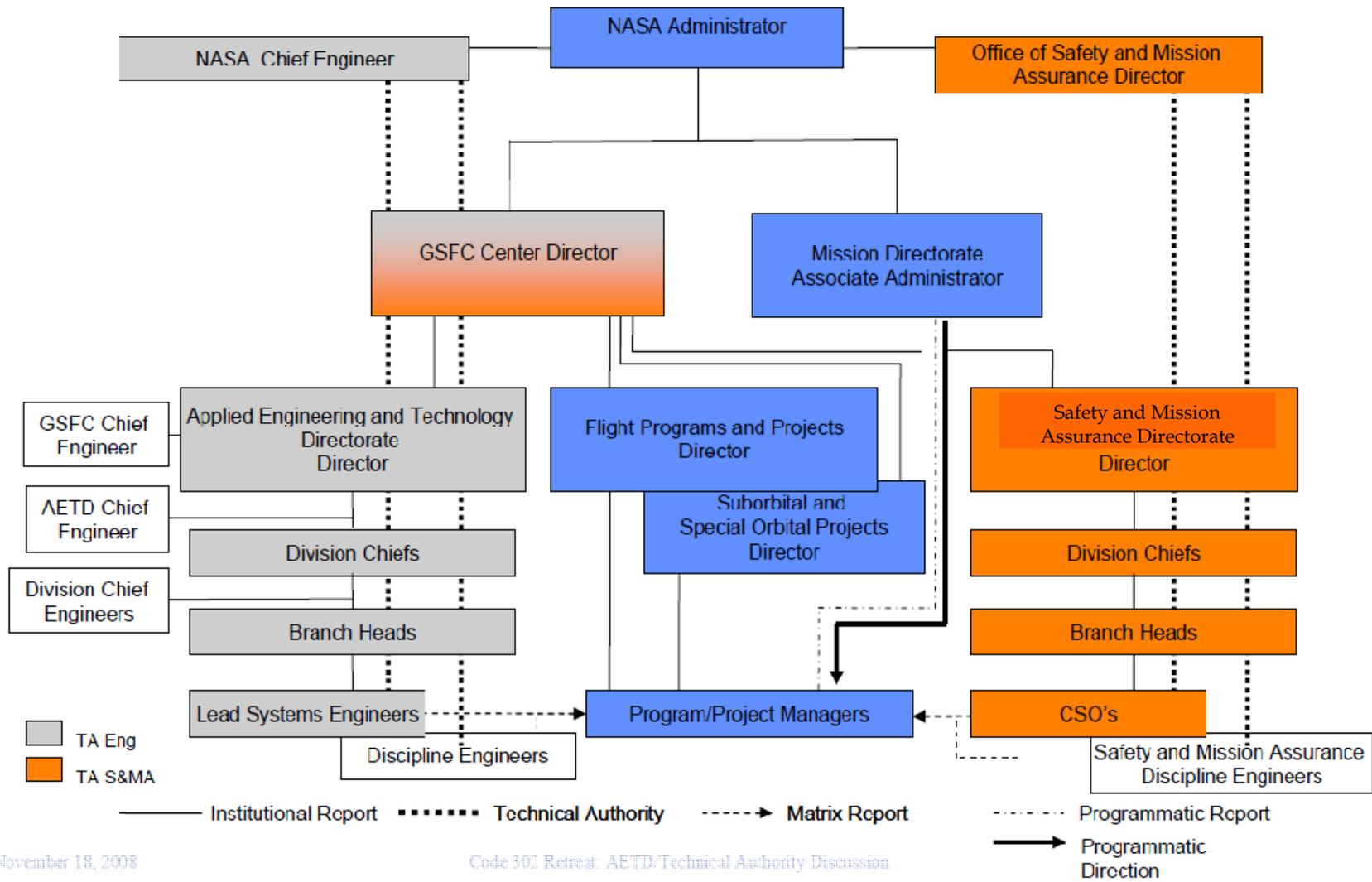


# The Role of SMA-D and the Technical Authority

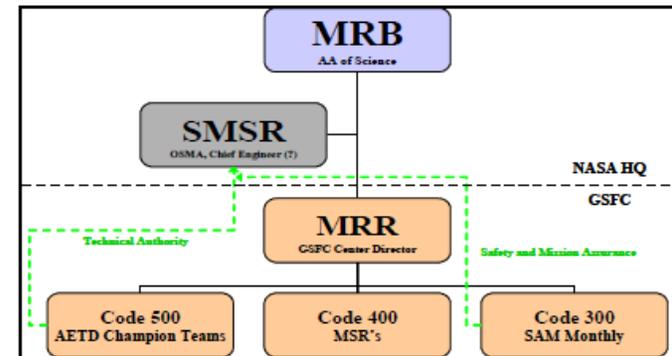
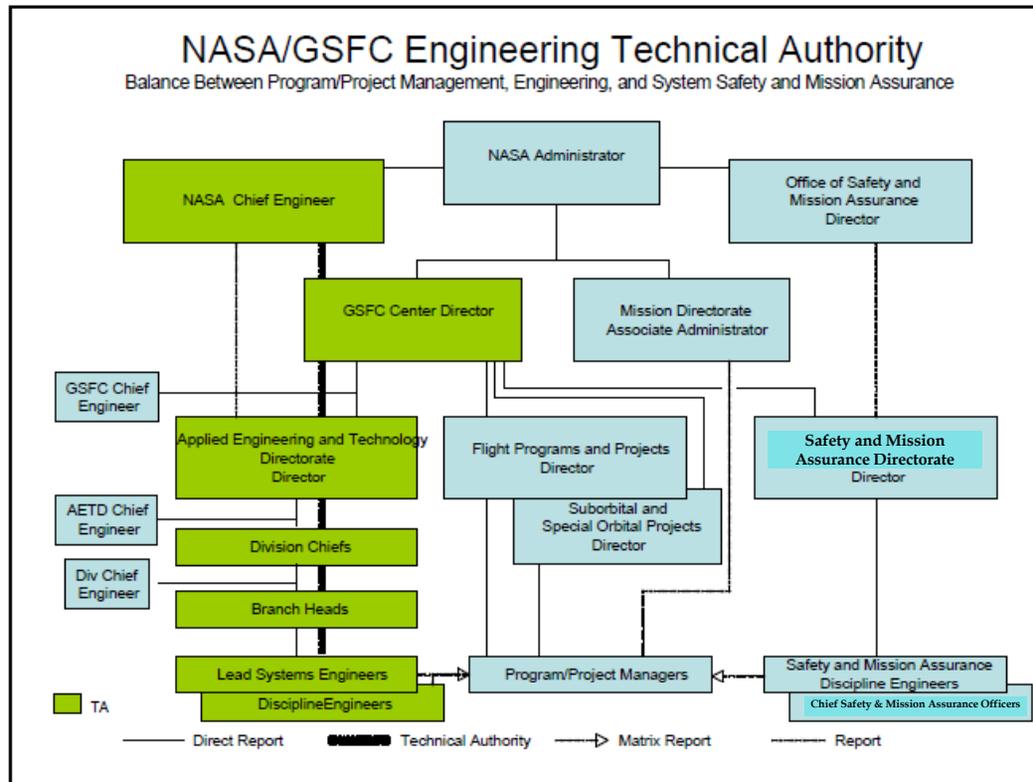




# NASA Governance Model



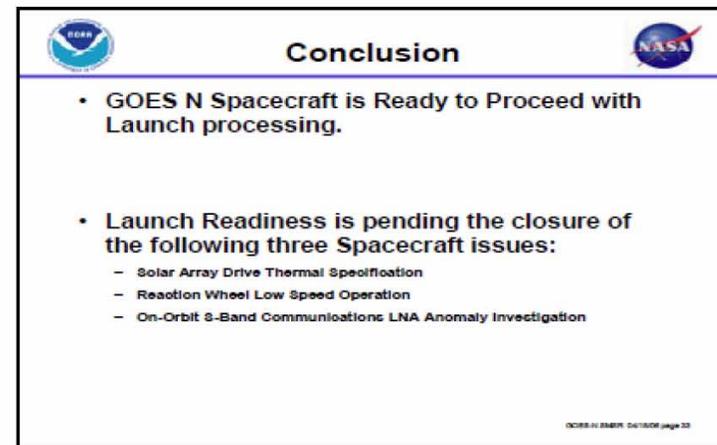
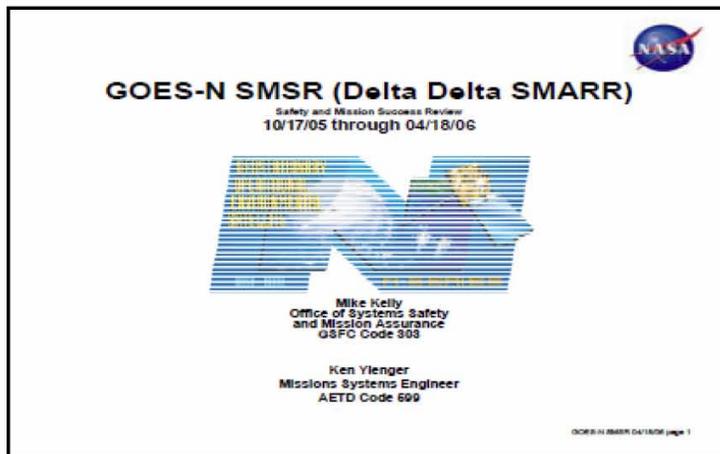
## Comparison of Launch Review Process and Role of Engineering Technical Authority



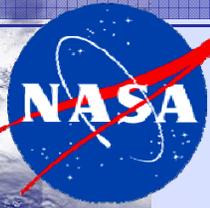
- NASA HQ Level Reviews dovetail the "Technical Authority" Chain-of-Command well
- SMSR (Safety and Mission Success Review) is co-chaired by:
  - Bryan O'Connor, Office of Safety and Mission Assurance (OSMA), and
  - Mike Ryschkewitsch, Office of Chief Engineer (OCE)

# Sample Charts from SMSR

## Mission Readiness Assessment

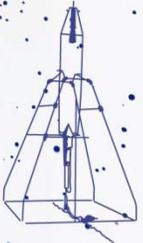


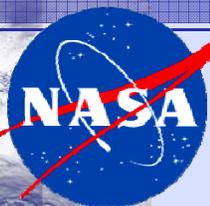
- “Go” from the Chief Safety and Mission Assurance Officer (CSO) and Technical Authority (TA) signifies concurrence with the following two statements:
  - **We affirm that residual risks within our areas of expertise and responsibility have been fully addressed at this SMSR.**
  - **Within our areas of responsibility, and acknowledging satisfactory completion of all open work, we recommend that the OSMA AA and NASA Chief Engineer concur with proceeding with this mission.**
- Also Providing “Go/”No Go” Assessments to OSMA/Bryan O’Connor and CE/Mike Ryschkewitsch
  - GSFC Center Director (or Deputy)
  - AETD Technical Authority (Orlando)
  - Chief, Safety and Mission Assurance Directorate (or Deputy)



# GSFC Mission Assurance Requirements

- GSFC document 320-MAR-1001 - “Standard Mission Assurance Requirements”
  - This document is intended for use in developing a Mission Assurance Requirements (MAR) document for contracts related to GSFC managed projects.
    - The baseline requirements are for a Class B mission.
    - A tailoring table with recommendations for modifying the requirements to a Class A, C, or D mission is included.
    - It can also serve as a guide to develop a project-level MAR.
    - The project-level MAR can be used to provide a high level perspective on assurance requirements that will be addressed in an out-of-house project's MAR or an in-house project's Mission Assurance Implementation Plan (MAIP).



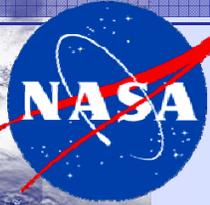


# GSFC Mission Assurance Requirements

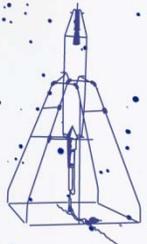
Appendix 6. Tailoring Table (for mission classifications A through D)

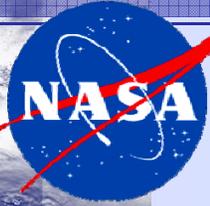
	<b>CLASS A</b>	<b>CLASS B</b>	<b>CLASS C</b>	<b>CLASS D</b>
<b>Examples</b>	TDRS, JWST	SDO, STEREO	MAP	FAST, IBEX
<b>Priority and Acceptable Risk Level</b>	High priority, very low (minimized) risk	High priority, low risk	Medium priority, medium risk	Low priority, high risk
<b>National Significance</b>	Very high	High	Medium	Low to medium
<b>Complexity</b>	Very high to high	High to medium	Medium to low	Medium to low
<b>Primary Lifetime</b>	Long, > 5 years	Medium, 2-5 years	Short	Short < 2 years
<b>Cost</b>	High	High to medium	Medium to low	Low





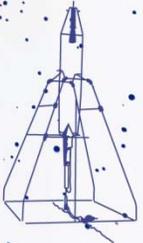
# GSFC Mission Assurance Requirements (Continued)

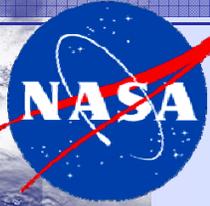




# GSFC Mission Assurance Requirements (Continued)

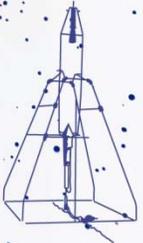
- Quality Management System
  - Requirements Flow down
  - Surveillance of developer
  - Control of sub-suppliers
  - Control of nonconforming product
  - Material Review Board
  - Failure reporting
  - Control of monitoring and measuring devices

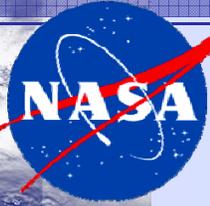




# GSFC Mission Assurance Requirements (Continued)

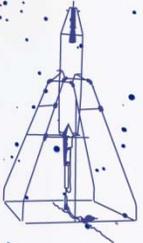
- Ground data systems requirements
  - QMS
  - Reviews
  - Assurance activities
  - Government furnished equipment, commercial-off-the-shelf, and purchased equipment/software
  - Reuse
  - Defect prevention
  - Databases
  - Security
  - Reliability and availability
  - Maintainability
  - Safety

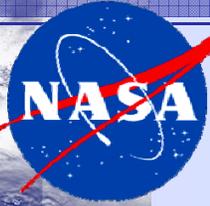




# GSFC Mission Assurance Requirements (Continued)

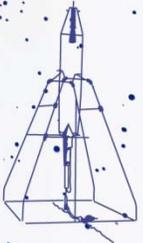
- Reliability and Maintainability
  - Probabilistic risk assessment
  - Reliability analysis
    - Failure Modes Effects Analysis
    - Fault Tree Analysis
    - Parts Stress
    - Worst Case
    - Reliability assessments and predictions
    - Software reliability
  - Limited Life items
  - Maintainability

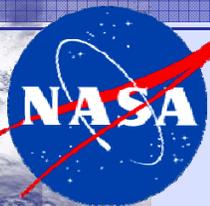




# GSFC Mission Assurance Requirements (Continued)

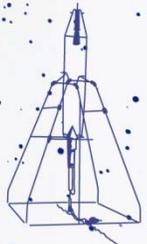
- System Safety
  - Documentation
  - Deliverables
  - Assessment reports
  - Pre-launch data package
  - Ground operations procedures
  - Noncompliance/waiver requests
  - Orbital debris assessment
  - Launch site support
  - Mishap reporting

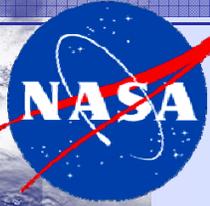




# GSFC Mission Assurance Requirements (Continued)

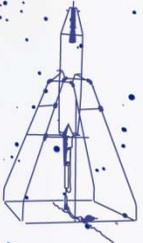
- Software Assurance
  - Software Quality
  - Software Safety
  - Software Reliability
  - Verification and Validation
  - Independent Verification and Validation
  - Reviews
  - Configuration management
  - Problem reporting and corrective action
  - Government furnished equipment and purchased software
  - Status reporting
  - Surveillance of software development

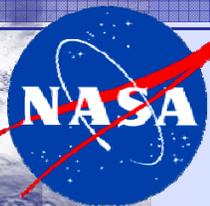




# GSFC Mission Assurance Requirements (Continued)

- Risk Management
- Integrated Independent Review
  - Mission Reviews
  - Instrument Reviews
  - Spacecraft Reviews
  - Operations Reviews
- Design Verification
  - System performance verification plan
  - Environmental verification plan
  - System performance verification matrix
  - Environmental test matrix
  - Environmental verification specification
  - Performance verification procedures
  - Verification reports
  - System performance verification report

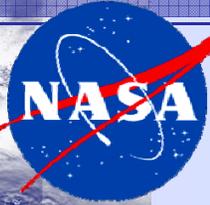




# GSFC Mission Assurance Requirements (Continued)

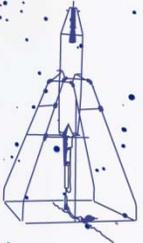
- Workmanship
  - Design
    - Printed wiring boards
    - Assemblies
    - Ground data systems that interface with space flight hardware
  - Workmanship
    - Training and certification
    - Flight and harsh environment ground systems workmanship
    - Ground systems (non-flight) workmanship
    - Documentation

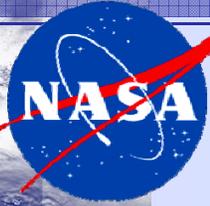




# GSFC Mission Assurance Requirements (Continued)

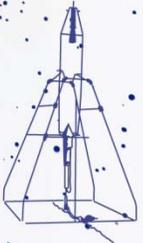
- Parts, Materials and Processes
  - Parts, materials and processes control boards
  - Management of PMP selection
  - Management of PMP engineering requirements
  - Management of PMP procurement
  - Radiation hardness
  - Government furnished equipment
  - Commercial off-the-shelf
  - PMP qualification
  - Failure analysis
  - Preservation and packaging
  - Handling
  - Data retention





# GSFC Mission Assurance Requirements (Continued)

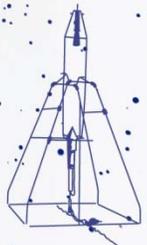
- Contamination Control
  - Verification process
  - Control plans
  - Material outgassing
  - Thermal vacuum bakeout
  - Hardware handling
- Electrostatic Discharge Control
- Government Industry Data Exchange Program (GIDEP) alerts and problem advisories

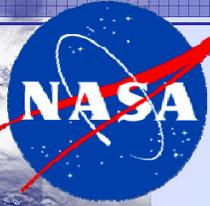


The NASA logo, featuring the word "NASA" in white capital letters on a blue circular background with a red swoosh and a white orbital path.

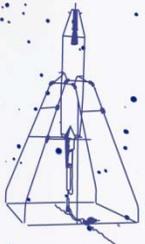
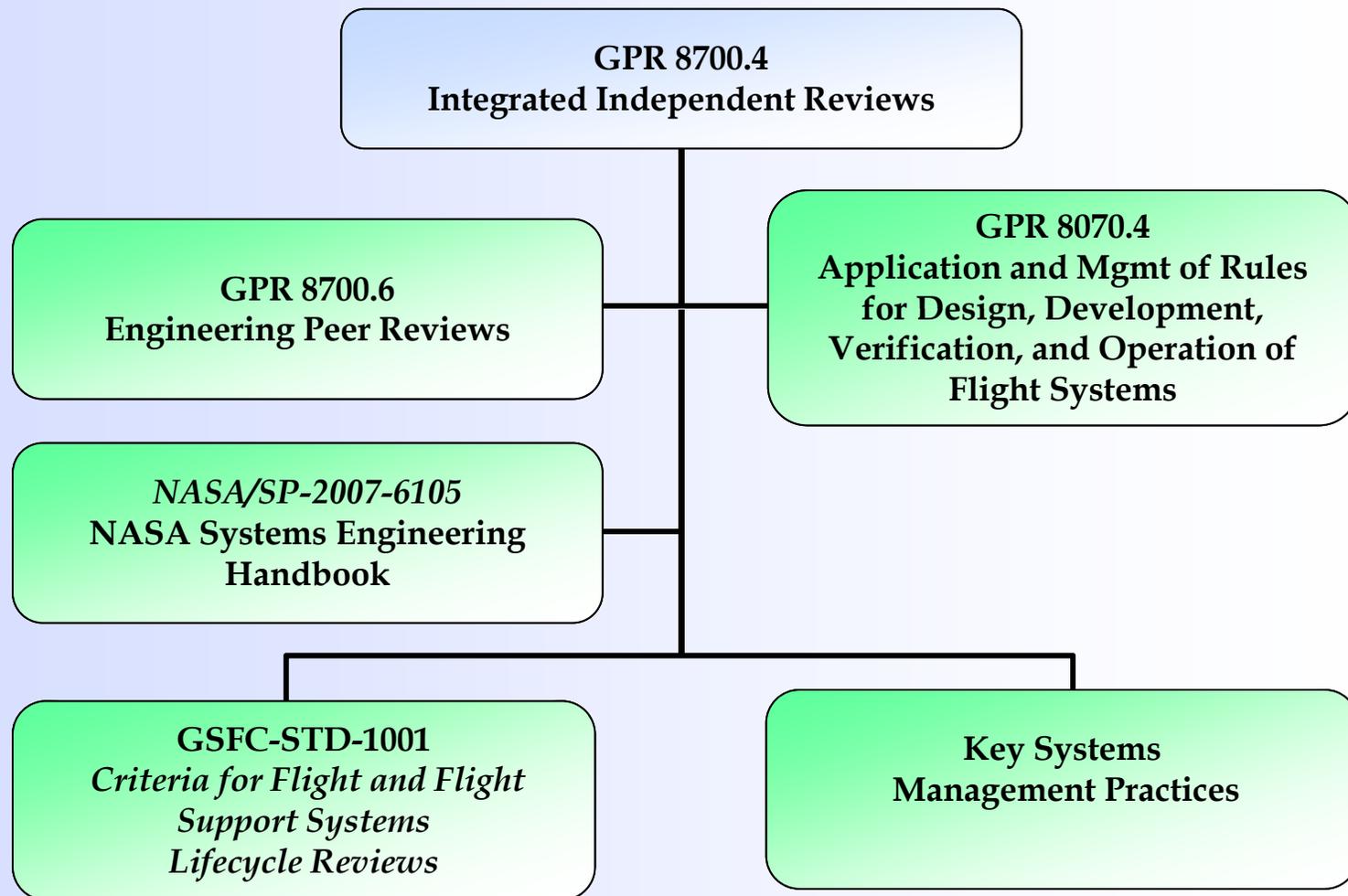
## Code 301 • Systems Review Office (SRO)

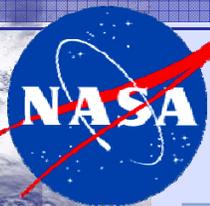
- Responsible for ensuring a continuous independent assessment of the implementation of GSFC missions to enhance the probability of their success
- Accomplished through a series of formal reviews (SCR, PDR, CDR, etc.) of the mission flight and ground elements at critical milestones in the project/mission lifecycle.
  - Combination of external and GSFC experts comprise review teams
- Assesses the adequacy of project engineering peer reviews



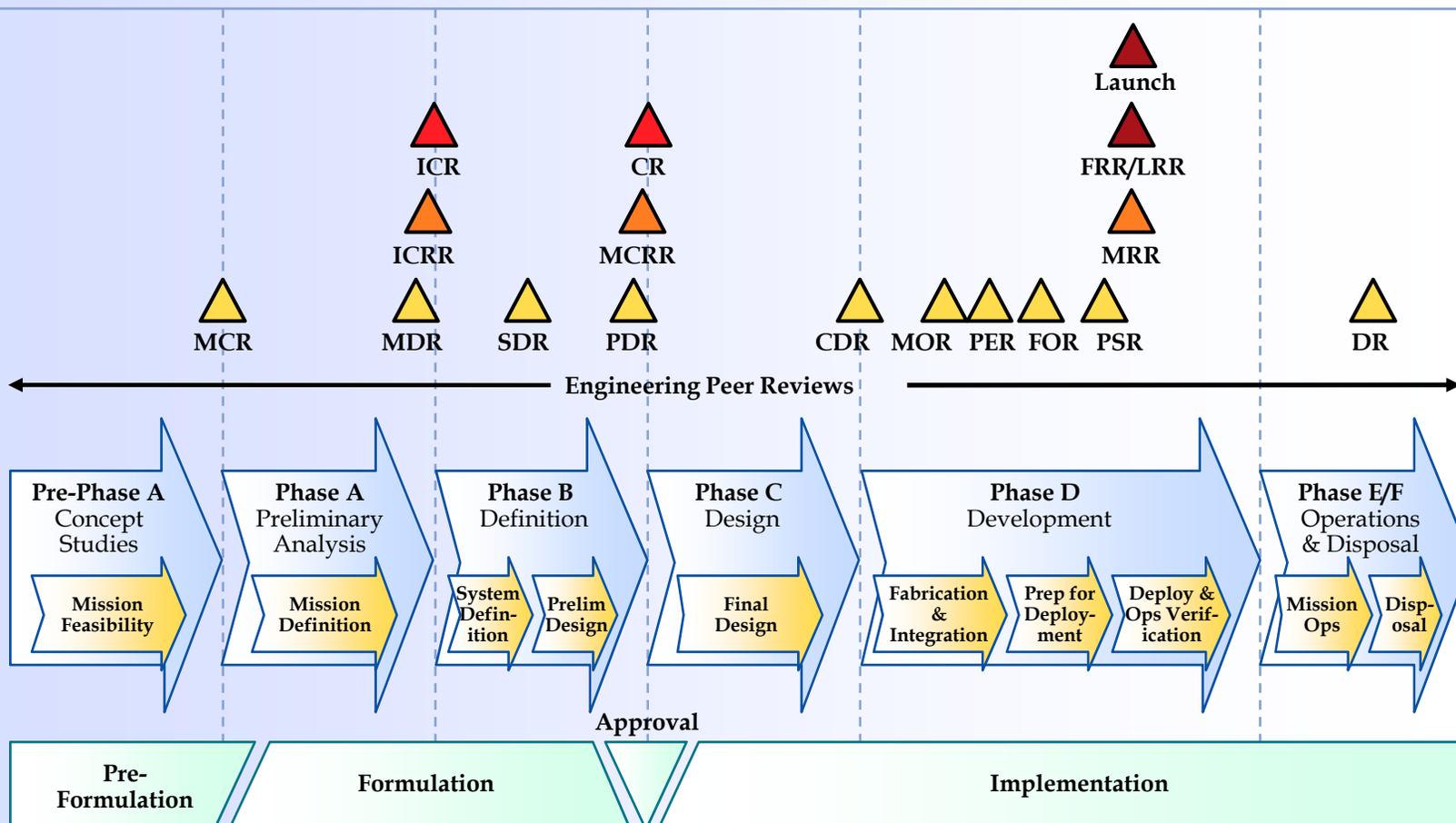


# Systems Review Requirements





# GSFC Project Lifecycle



## LEGEND

▲ HQ Reviews

▲ IR Reviews

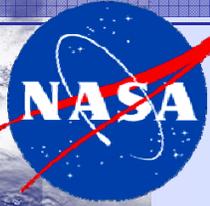
▲ GPMC Gateway Reviews

▲ KSC Pre-Launch Readiness Review

CDR - Critical Design Review  
 CR - Confirmation Review  
 DR - Disposal Review  
 FOR - Flight Operation Review  
 FRR - Flight Readiness Review  
 ICR - Initial Confirmation Review (Code S Only)  
 ICRR - Initial Confirmation Readiness Review (Code S Only)  
 LRR - Launch Readiness Review  
 MCR - Mission Concept Review

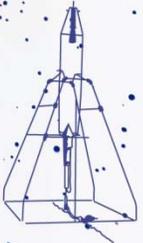
MCRR - Mission Confirmation Readiness Review  
 MDR - Mission Definition Review  
 MOR - Mission Operations Review  
 MRR - Mission Readiness Review  
 PDR - Preliminary Design Review  
 PER - Pre-Environment Review  
 PSR - Pre-Ship Review  
 SDR - System Definition Review

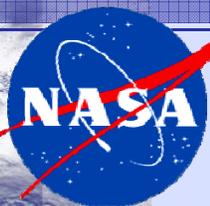




# Systems Review Process

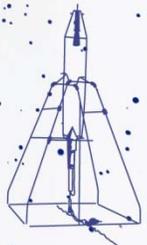
- Process begins with development of Integrated Independent Review Plan--signed by Chief SRO
  - Requirements for reviews, basic team structure
  - Basic team structure
  - Required reviews
- A Systems Review Manager (SRM) is assigned
- The SRM is involved with the project throughout its life
  - Attendance at champion team meetings
  - Attendance at peer reviews
  - Participation in special technical evaluations

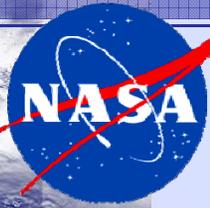




## Systems Review Process (Continued)

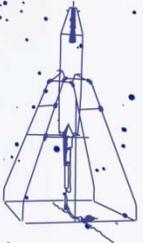
- The Project and SRM develop a review schedule
- Appointment memos designate individual teams for each review
  - Based on required expertise
  - Always includes GSFC Chief Engineer
  - Always includes external component
  - Mission Level appointment letters are reviewed by SRM, SMA-D Director and signed by Deputy Center Director
  - System Level Review appointments are reviewed by SRM, SMA-D Director and Deputy Center Director

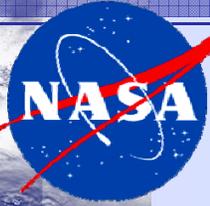




# Systems Review Reporting

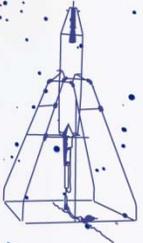
- The SRO presents metrics of RFA status at SMA-D monthly
  - Open RFAs from each review
  - Identification of critical RFAs
  - Identification of overdue RFAs
  - Identification of liens against a major event (pre-environmental, Pre-ship, etc.)
- Projects (or originators) who appear to be falling behind in closure are called in for “table top” reviews with the Director, SMA-D, SRM, and Chief, SRO.
  - Difficulties in closing actions are identified
  - Plans for resolution are identified
- Status reported monthly by SMA-D to the Center

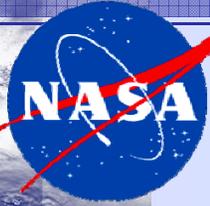




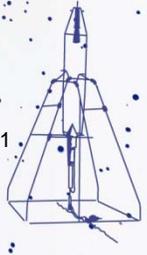
## Systems Review Reporting (Continued)

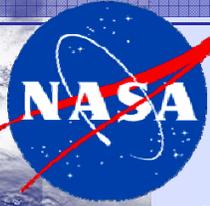
- Mission level and complex instrument review results are reported immediately in briefing to the Deputy Center Director, Project, SMA-D, and AETD
- A review report with requests for action (RFA) is written and formally released to project.
- Each RFA is tracked and documented by SRM
- RFA status and review results are summarized during Monthly Status Review process
- SRM reports directly to the PMC at Confirmation Readiness and Mission Readiness Reviews
- SRO provides mission residual risk assessment to Center Director and HQ Office of Safety and Mission Assurance prior to launch





# GSFC Supply Chain Management Program





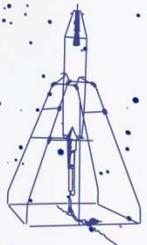
# Options for Supplier Oversight

- SMA-D Representative as part of the GSFC resident office
  - Coordinate between supplier and GSFC on resolution of general issues
  - Participate in Material Review Boards and failure investigations
    - Voting prerogative depends on contract provisions
  - Participate in test readiness reviews
  - Establishment of mandatory inspection points (“MIPs”)
  - Oversees government furnished equipment
  - Coordinates waivers/deviations with GSFC
  - Coordinates GSFC Safety support at supplier facility (as needed)
  - Document reviews
  - Anomaly/Safety incident notifications to GSFC
  - Status reporting



## Options for Supplier Oversight (continued)

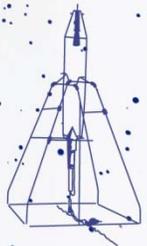
- NASA Contractor Assurance Services (NCAS) via task order
  - Performs assessments of supplier's quality system
  - Performs audits of supplier's compliance to processes
  - Performs Surveillance including MIPs, testing and verification activities
- Defense Contract Management Agency (DCMA) via Letter of Delegation (LOD) (itinerant or in-plant)
  - Performs mandatory inspection points ("MIPs") at points where hardware:
    - is subsequently going to become inaccessible
    - Is subsequently going to be subjected to an irreversible process
  - Performs final inspection of hardware and documents

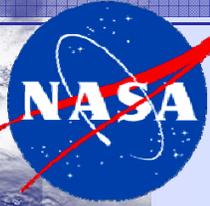


The NASA logo, featuring the word "NASA" in white capital letters on a blue circular background with a red swoosh and a white orbital path.

# Supply Chain Management Program

- GSFC sponsored program that supplements GSFC assurance resident, Defense Contract Management Agency, and/or NCAS representative to provide an assessment of the Supplier's Processes/Procedures.
- Provides "independent" assessment of the Supplier Quality assurance and Safety programs of many of NASA shared contractors
- Provides surveillance for specific projects on a case by case basis

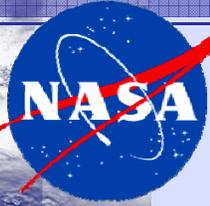




## What Supply Chain Does

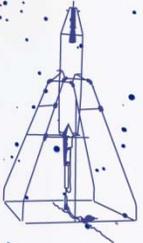
- Conduct independent assessments of suppliers to mission programs/projects
  - Assess conformance with contractual requirements and ISO/AS9100 quality management standards
  - Report and share assessment findings within NASA
  - Monitor corrective actions / improvements to enable and support the provision of quality products and services
- Engage the Supplier / GSFC / NASA communities via the annual Supply Chain conference, NAMT / JAPC
  - Share best practices and knowledge; address challenges and opportunities
- Build teamwork and collaboration to foster value-added results

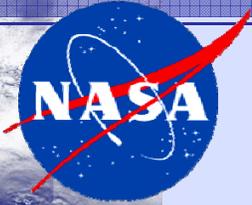
Assuring Mission Success is Our  
Driving Focus!



# GSFC Supply Chain Organization Functions

- Conducts Supplier assessments
- Maintains Records of assessments in GSFC audit database
- Sponsors Quality training (e.g. AS9100 quality system, ISO Lead Auditor)
- Sponsors suppliers conferences
- Is Technical Liaison for NASA Contract Assurance Services (NCAS)
- Is Focal Point for Defense Contract Management Agency (DCMA)
- Working with NASA Assurance Management Team (NAMT) – all NASA Centers Participation
- Working with Joint Audit Planning Committee (JAPC) – Primes and other Government Agencies (NASA, MDA, NRO, and DCMA)



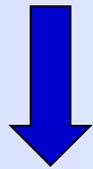


# Process Overview

## GSFC Supplier Assessments

### Plan Assessment

- Selection Factors
- Scheduling and Coordination
- Tailored Assessment Plan



### Conduct Assessment

- GSFC-led expert team
- Strengths and Areas for Improvement (Findings)
  - Reporting



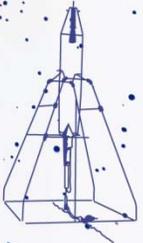
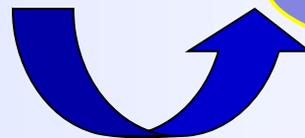
### Assessment Follow-up

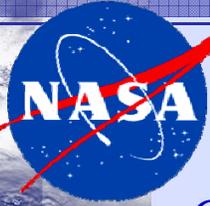
- Corrective / Preventive Actions
  - On-site Verification
  - Reporting



- Knowledge Sharing
- Assessment Database

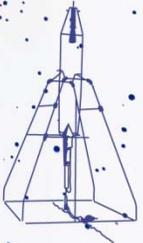
- NASA Projects
- NASA Acquisition Processes
  - NASA Centers
  - Other Agencies



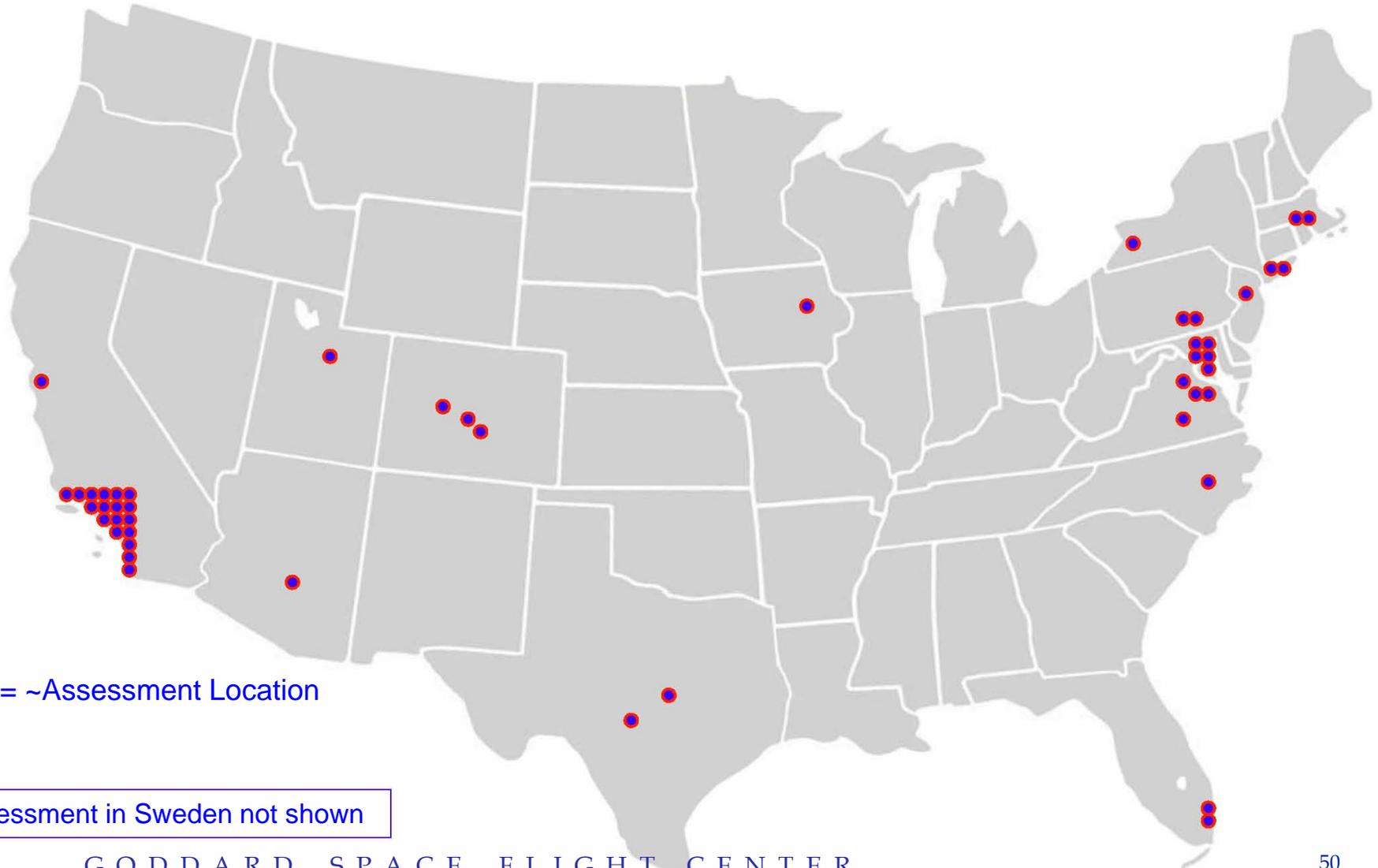


# Supplier Assessments FY 2009

- Conducted 48 assessments of suppliers (34 full; 14 follow-up) throughout the supply chains of multiple projects
  - 48 full/follow-up assessments completed in FY 2008
- Assessments supported GSFC's portfolio of mission programs / projects, including:
  - Landsat Data Continuity Mission (LDCM)
  - Geostationary Operational Environmental Satellites (GOES)
  - James Webb Space Telescope (JWST)
  - Radiation Belt Storm Probes (RBSP)
  - Tracking and Data Relay Satellite (TDRS-K)
  - Gamma-ray Large Area Space Telescope (GLAST)
  - Global Precipitation Measurement (GPM)
  - Solar Dynamics Observatory (SDO)
- Corrective / preventive actions reviewed, underway and/or verified



# Supplier Assessments FY 2009 ~ Locations



● = ~Assessment Location

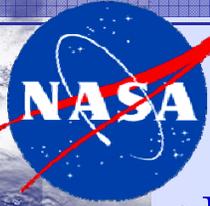
Assessment in Sweden not shown



## *Sample Assessment Plan "items to be reviewed"*

The following list provides an outline of some of the topics the assessment team will review:

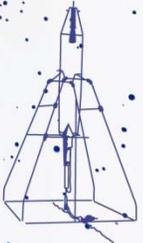
- Flowdown of contractual requirements
- Receiving inspection
- Configuration Management / Change Control
- Packaging
- Handling
- Parts sampling, selection, and traceability
- Training and Certification of operators/inspector
- Process documentation adequacy (work orders,
- Document control
- Workmanship and inspection
- Travelers, routers and configuration recording
- Nonconforming product control
- Scrap control
- Rework and repair processes
- Acceptance Data Packages
- Problem Reporting System
- Internal Audit
- Calibration
- GFE
- Industrial Safety
- System Safety
- GIDEP



# Supplier Assessments

## Looking Ahead – FY 2010

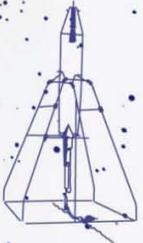
- Perform 40 to 50 assessments throughout the supplier base for GSFC mission projects
  - Primes and lower tiers: systems integrators/developers, and suppliers of subsystems, components, parts and materials
- Coordinate / collaborate with GSFC mission projects, prime contractors, and other NASA centers and federal agencies
  - Engage project CSOs (Chief Safety & Mission Assurance Officers) and management
  - Participate in NAMT / JAPC
  - Enhance assessment teams with observers / assessors from projects, other centers / agencies and direct customers / primes
- Flow “GSFC / Customer Actions” from supplier assessments into GSFC’s internal corrective action process
- Use GSFC internal auditors in supplier assessments
- Complete piloting of agency online system (SAARIS) for GSFC supplier assessments

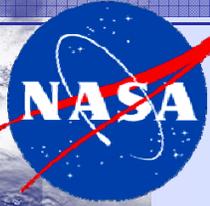




NASA

# GSFC ISO9001/AS9100 Status Brief

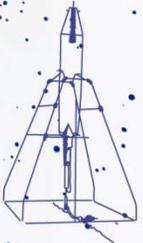


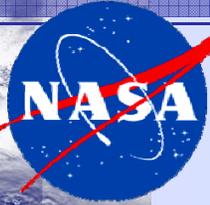


# ISO9001/AS9100

## Background

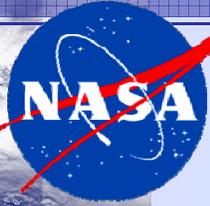
- ISO9001
  - Set of standards for quality management systems
  - Ensures organizations meet product/service quality requirements
- AS9100
  - Quality standard that meets needs of aerospace industry
  - Duplicate of ISO9001 with additional requirements





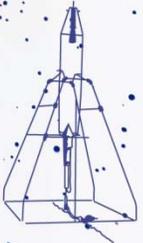
## ISO9001/AS9100 Background cont.

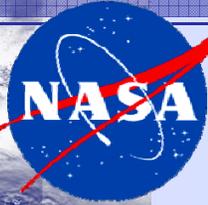
- GSFC currently registered to ISO9001:2008
  - Completed 3-year re-assessment in September 2008
  - Surveillance audits conducted every March and September
    - September 2009 surveillance audit was successfully completed
- GSFC compliant with AS9100 Rev B.
  - Based on self-assessment
  - Conducted gap analysis in 2006
- Other NASA Centers are registered to either ISO9001 or AS9100



## ISO9001/AS9100 NASA Requirements

- NPD 1280.1, NASA Management System Policy
  - Management System must meet a minimum set of criteria
  - ISO9001 or AS9100 may be used to satisfy NPD
- NPD 8730.5, NASA Quality Assurance Program Policy
  - Critical and complex work shall be performed using AS9100
  - Critical, but not complex, work shall be performed using AS9100, ISO9001, or AS9003.
  - Requirement is for compliance, as opposed to certification





# ISO9001/AS9100

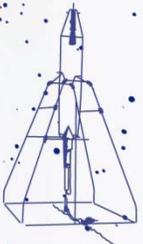
## Scope: Critical and Complex

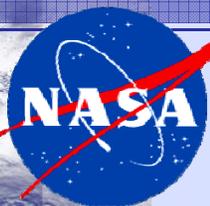
- Scope of AS9100 includes work defined as both critical and complex (as defined in NPR 8730.5)

*“Critical work is any hardware task that, if performed incorrectly or in violation of prescribed requirements, could result in loss of human life, serious injury, loss of mission, or loss of a significant mission resource (e.g., Government test or launch facility).”*

*“Complex work involves either:*

- a) the design, manufacture, fabrication, assembly, testing, integration, maintenance, or repair of machinery, equipment, subsystems, systems, or platforms; or*
- b) the manufacture/fabrication of parts or assemblies which have quality characteristics not wholly visible in the end item and for which conformance can only be established progressively through precise measurements, tests, and controls applied.”*





## Closing

- Thank you for the opportunity to present Goddard Space Flight Center's approach to Safety and Mission Assurance.
- If there are any questions, please do not hesitate to contact me:
  - Mike Kelly, Institutional Support Office, Chief
  - 301-286-0662 (office)
  - 301-980-4384 (cell phone)
  - [Michael.P.Kelly@nasa.gov](mailto:Michael.P.Kelly@nasa.gov)

