NASA Office of Safety and Mission Assurance

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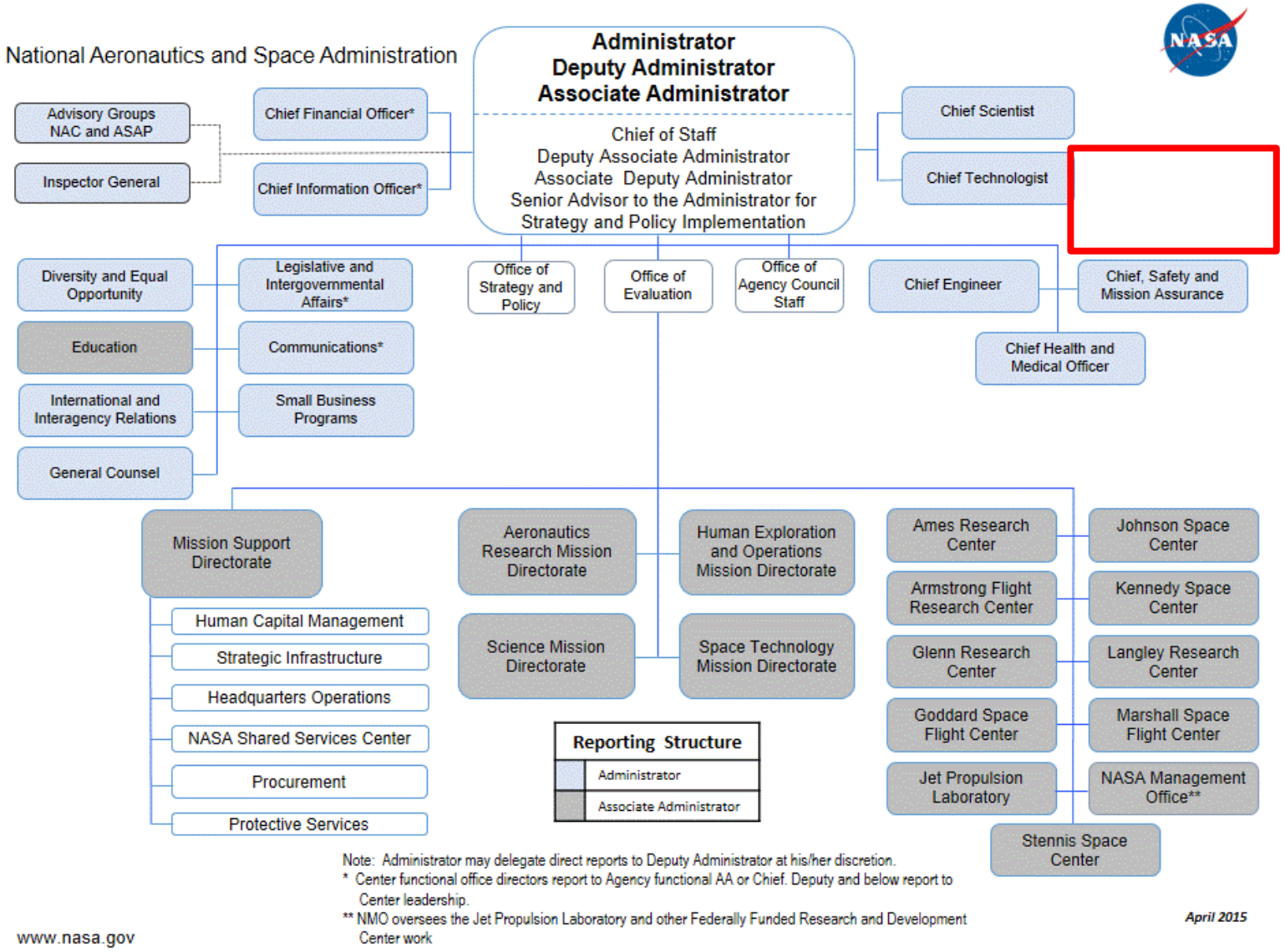
OSMA Overview

- **Mission:** "The Office of Safety and Mission Assurance (OSMA) provides policy direction, functional oversight, and assessment for all Agency safety, reliability, maintainability, and quality engineering and assurance activities and serves as a principal advisory resource for the Administrator and other senior officials on matters pertaining to safety and mission success" [NPD 1000.3]

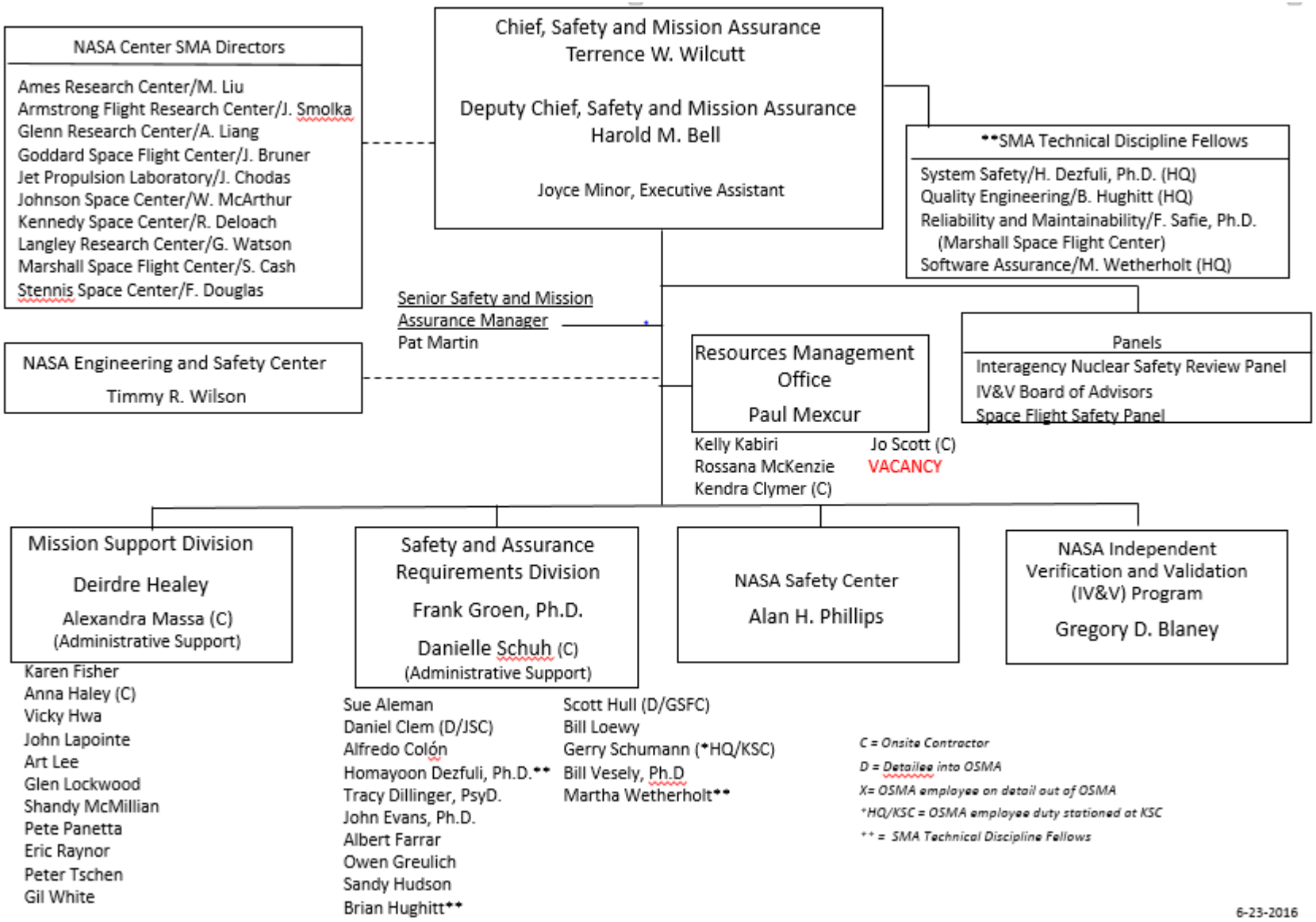
- **Objective:** Ensure effective management of NASA programs and operations to complete the mission safely and successfully [NASA 2014 Strategic Plan]

- The Office of Safety and Mission Assurance represents one of three Technical Authority areas: Engineering, SMA, Health and Medical.

Place within the NASA Organization



OSMA Organization



NASA Office of Safety and Mission Assurance Initiatives

Independent Verification and Validation (IV&V) Program Cybersecurity

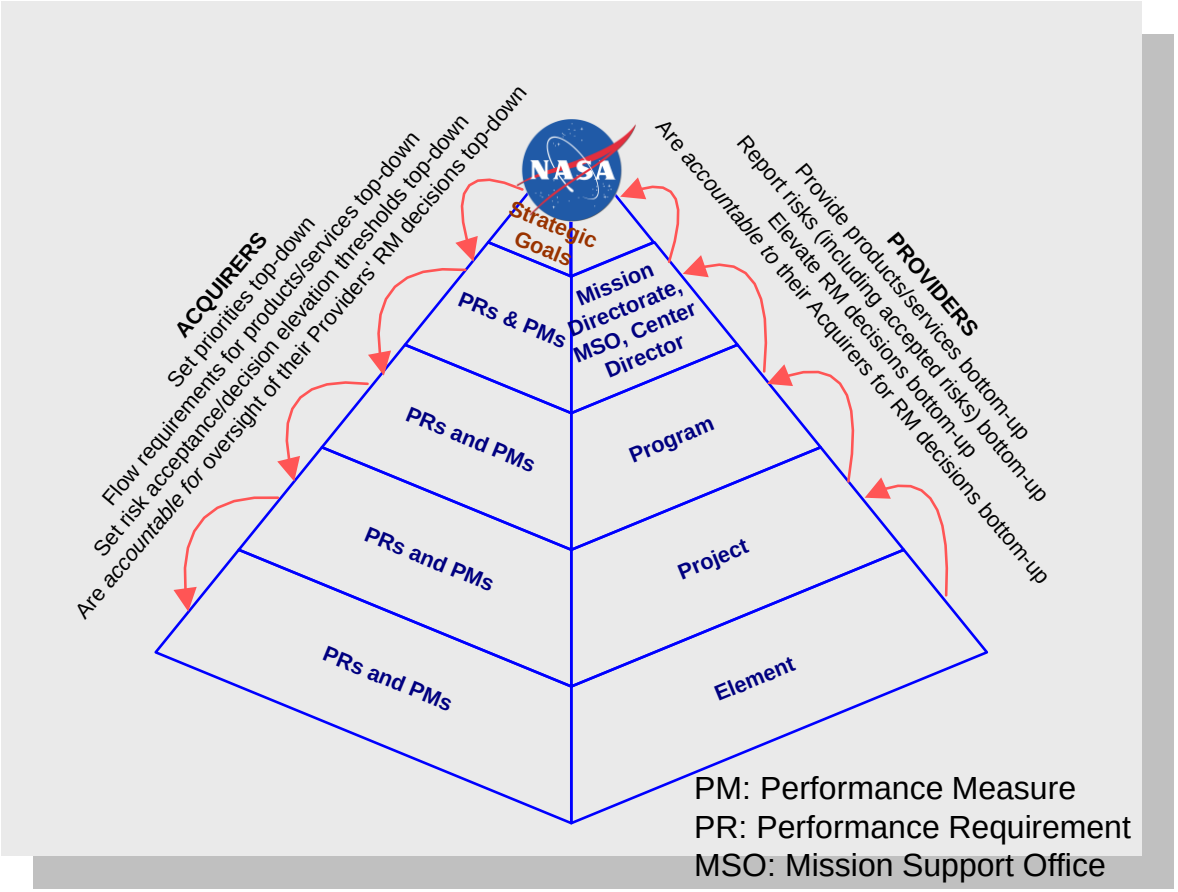
- Develop industry-leading cybersecurity tools and processes

- Promulgating capabilities to design security into new mission architectures
  - Vulnerability assessment, penetration testing, code analysis

– Enhance understanding by software developers and assurance personnel
  - Information about today's top exploits
  - Guidelines, tools, resources, and requirements for secure coding

Risk Acceptance (RA)

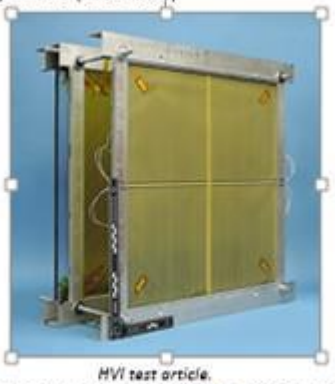
- Strengthen risk acceptance policies to improve accountability
- Expand on existing risk management requirements
  - Development and documentation of rationale
  - Consideration of alternatives
  - Single signature risk acceptance
  - TA concurrence
- Completing update of risk management directive (NPR 8000.4)



Orbital Debris Environment Characterization

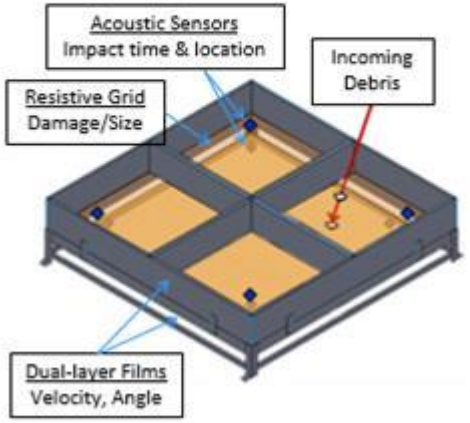
- Fill a key data gap on millimeter-sized debris objects in the range of 700-1000km
  - Pursuing space-based measurements
  - Highest risk to critical satellites (observation, weather)
- Needed for a high-fidelity environment model
  - to support shielding designs
- Exploring flight opportunities for sensor suite
  - Impact detection technologies developed during past 10 years

Debris Resistive Acoustic Grid Orbital NASA-Navy Sensor (DRAGONS)

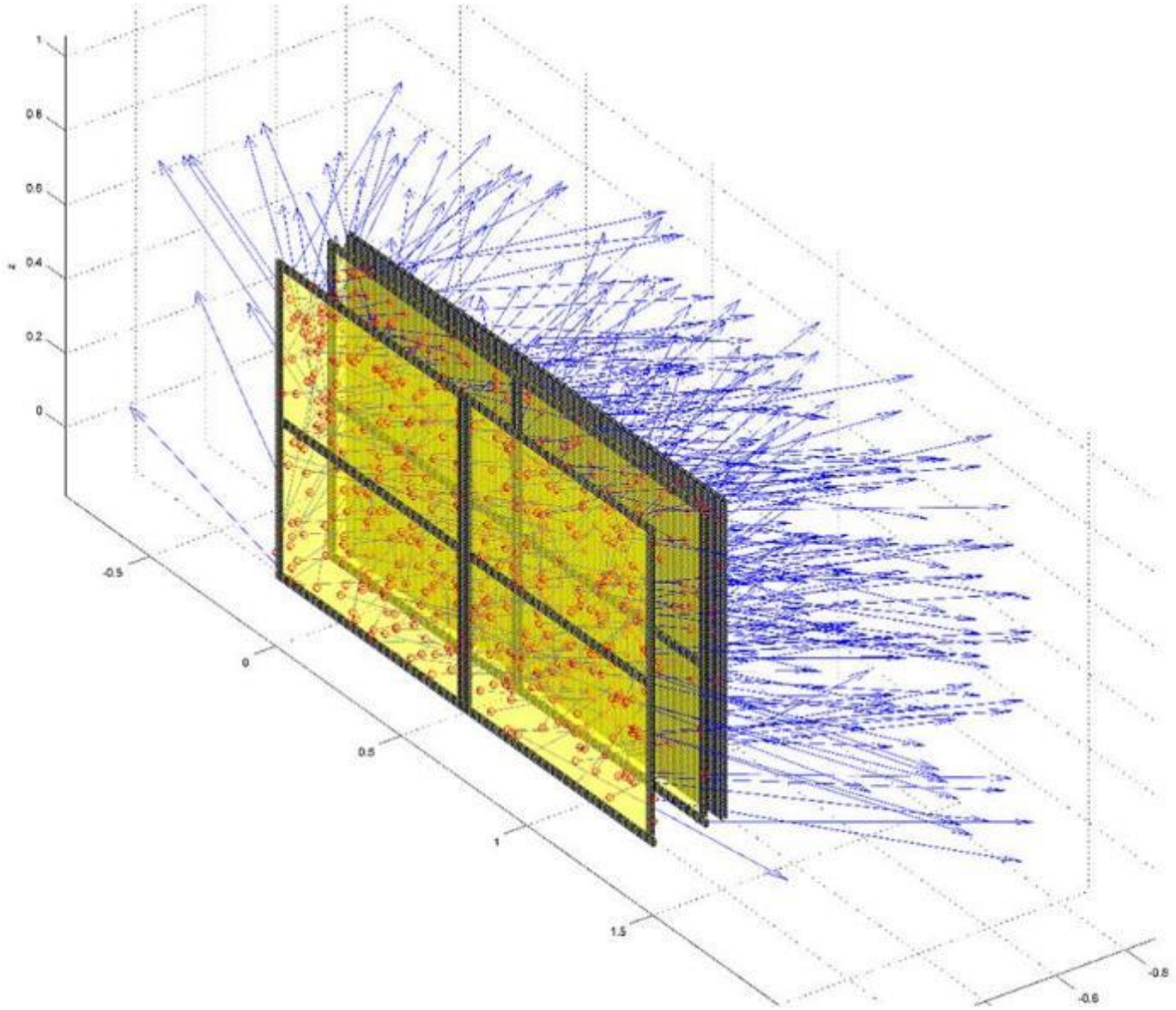


HVI test article.
Top layer is resistive grid on Kapton. Middle layer is Kapton, third layer is Lexan. All 3 layers have four acoustic sensors and Lexan has two accelerometers.
This is one quadrant of the flight collector.

- DEBRIS RESISTIVE ACOUSTIC GRID ORBITAL NAVY-NASA SENSOR (DRAGONS)



Output of Space Debris Sensor Simulator



Safety Culture (SC)

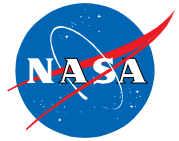
- Improve SC via assessment, education, engagement, and guidance
  - Based on five-factor model

- Activities include
  - Ongoing SC surveys and responses at the Centers
  - Training of the NASA workforce during onboarding
  - Targeted organizational safety assessments
  - Issuance of the safety culture handbook

Policy Changes (Complete or Imminent)

- Human Rating Requirements directive (NPR 8705.2)
  - Updates and clarifications based on Constellation/ESD/CCP experiences
- Orbital Debris directive (NPR 8705.6)
  - Reformulation of responsibilities and procedural requirements
- Workmanship standards (NS 8739.1/4/6)
  - Significant technical updates and corrections
  - Details at http://sma.nasa.gov/sma-disciplines/workmanship
- Mishap Investigation (NPR 8621.1)
  - Modification of endorsement and release processes

Summary/Conclusions



BACKUP

Major Programs and Functions

MSD (HQ)

- Center and Mission Directorate liaisons
- Safety and Mission Success Reviews
- NASA Safety Reporting System
- Annual Operating Agreement reviews

SARD (HQ)

- SMA discipline and program leadership
- Assessment of SMA capabilities and needs
- SMA standards and directives management
- Research, development and test programs
- Program/project technical reviews
- Agency-level discipline working groups
- Safety culture assessments

NSC (Cleveland, OH)

- **SMA Technical Excellence program**
- **Mishap investigation program support**
- **SMA knowledge management program**
- **SMA audits and assessments**

IV&V (Fairmont, WV)

- **Independent technical analysis of safety and mission critical software products**
- **Software SMA support**
- **Cybersecurity and information assurance**
- **Independent testing**
- **Software Assurance Research Program (SARP) management**

SMA Delegated Programs

- Located at centers, provide technical leadership for various SMA discipline areas:
  - Micrometeoroid and Orbital Debris Program (MMOD)
  - Non-Destructive Evaluation Program (NDE)
  - NASA Electronic Parts Program (NEPP)
  - Workmanship Program
  - ELV Payload Safety Program
  - Range Safety Program
  - Software Assurance Research Program