NASA Office of Safety and Mission Assurance

Frank Groen
Trilateral SMA Meeting, Tokyo, Japan
September 2016
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

National Aeronautics and Space Administration

Administrator
Deputy Administrator
Associate Administrator

Chief of Staff
Deputy Associate Administrator
Associate Deputy Administrator
Senior Advisor to the Administrator for Strategy and Policy Implementation

Diversity and Equal Opportunity
Inspection and Quality Assurance
National Aeronautics and Space Administration
NAC and ASAP

Chief Financial Officer
Chief Information Officer
Chief Engineer
Chief Scientist
Chief Technologist

Legislative and Intergovernmental Affairs
Communications
Small Business Programs

Office of Strategy and Policy
Office of Evaluation
Office of Agency Council Staff

Chief Health and Medical Officer

Mission Support Directorate
Aeronautics Research Mission Directorate
Human Exploration and Operations Mission Directorate
 Ames Research Center
 Armstrong Flight Research Center
 Glenn Research Center
 Goddard Space Flight Center
 Jet Propulsion Laboratory

Johnson Space Center
Kennedy Space Center
Langley Research Center
Marshall Space Flight Center
Stennis Space Center

NASA Shared Services Center
Procurement
Protective Services

Science Mission Directorate
Space Technology Mission Directorate

Note: Administrator may delegate direct reports to Deputy Administrator at his/her discretion.
Center functional office directors report to Agency functional AA or Chief Deputy and below report to Center leadership.
** NMO oversees the Jet Propulsion Laboratory and other Federally Funded Research and Development Center work.

www.nasa.gov

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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
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

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<th>SARD (HQ)</th>
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<td>• Center and Mission Directorate liaisons</td>
<td>• SMA discipline and program leadership</td>
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<td>• Safety and Mission Success Reviews</td>
<td>• Assessment of SMA capabilities and needs</td>
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<td>• NASA Safety Reporting System</td>
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<td>• Annual Operating Agreement reviews</td>
<td>• Research, development and test programs</td>
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<td>• Program/project technical reviews</td>
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<td>• Agency-level discipline working groups</td>
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<td>• Safety culture assessments</td>
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### 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