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.
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

<table>
<thead>
<tr>
<th>MSD (HQ)</th>
<th>SARD (HQ)</th>
</tr>
</thead>
</table>
| - Center and Mission Directorate liaisons  
- Safety and Mission Success Reviews  
- NASA Safety Reporting System  
- Annual Operating Agreement reviews | - 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 |

<table>
<thead>
<tr>
<th>NSC (Cleveland, OH)</th>
<th>IV&amp;V (Fairmont, WV)</th>
</tr>
</thead>
</table>
| - SMA Technical Excellence program  
- Mishap investigation program support  
- SMA knowledge management program  
- SMA audits and assessments | - 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