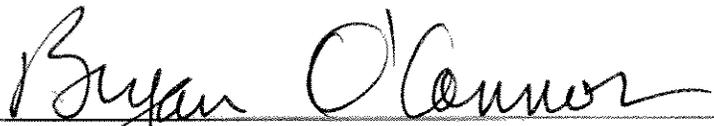
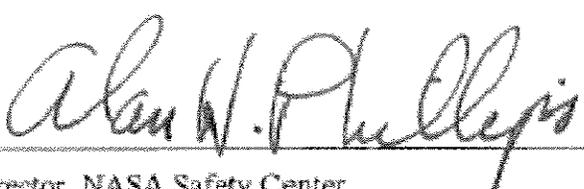


## Office of Safety and Mission Assurance Functional Leadership Plan

 _____ Chief, Safety and Mission Assurance	<u>25 APR 2011</u> Date
 _____ Deputy Chief, Safety and Mission Assurance	<u>25 APRIL 2011</u> Date
 _____ Director, Safety and Assurance Requirements Division	<u>4/19/11</u> Date
 _____ Director, Mission Support Division	<u>4/17/11</u> Date
 _____ Resources Manager	<u>4/13/11</u> Date
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### DOCUMENT HISTORY LOG

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Baseline		April 12, 2000	
Addenda	1	July 11, 2000	Add Appendix conveying each Center SMA Directors' concurrence with plan.
Revision	2	2004	Updates to reflect organizational changes
Cancellation	2	2008	Document cancelled
Revision	3	April 26, 2011	Document reinstated and updated to reflect organizational changes

## Introduction

*NASA's constant attention to safety is the cornerstone upon which we build mission success. We are committed, individually and as a team, to protecting the safety and health of the public, our team members, and those assets that the Nation entrusts to the Agency.*

*NPD 1000.0, Governance and Strategic Management Handbook*

The Office of Safety and Mission Assurance (OSMA) provides policy direction, functional oversight, and assessment for all Agency Safety and Mission Assurance (SMA) activities in support of safe and successful missions and operations. SMA activities include safety, reliability, maintainability, and quality engineering and assurance; risk management; mishap reporting, investigating, and recordkeeping; range safety; payload safety; nondestructive evaluation; metrology and calibration; the NASA Orbital Debris Program; NASA Electronic Parts Program; and the Software Assurance Research Program. OSMA provides support to Mission Directorates, programs, projects, and Centers. OSMA also manages and funds the NASA Safety Center and the NASA Independent Verification and Validation (IV&V) Facility.

The principal responsibilities of the OSMA may be found in paragraph 4.6 of NPR 1000.3, The NASA Organization. The directives, standards, handbooks, and office work instructions under the authority of OSMA are listed on the NASA Safety and Mission Assurance Documentation Status Tree web page at: <http://www.hq.nasa.gov/office/codeq/doctree/index.htm>.

This Functional Leadership Plan describes the fundamental goals and high level strategies for guiding the OSMA in fulfilling the SMA role within NASA. The Center SMA organizations work closely with the OSMA in pursuing the strategies and objectives of this functional plan. The plan is presented in four parts.

Part 1: Mission, Goals, and Strategies (Objectives)

Part 2: Organization and Interfaces

Part 3: Agency Safety Metrics

Part 4: OSMA Key Work Activities and Internal Controls

## References

NPD 1000.0, NASA Governance and Strategic Management Handbook.

NPD 1000.3, The NASA Organization.

NPD 8700.1, NASA Policy for Safety and Mission Success.

## **Part 1: Mission, Goals, and Strategies (Objectives)**

1.1 The OSMA mission is to assure the safety and enhance the potential for success of all NASA activities.

1.2 OSMA has six overarching goals:

- a. Protect the public, NASA workforce, high-value equipment and property, and the environment from potential harm as a result of NASA activities and operations by factoring safety as an integral feature of programs, projects, technologies, operations, and institutions/facilities.
- b. Integrate and implement SMA throughout the life cycle of NASA's programs and institutional/facility operations (from inception to completion).
- c. Develop and apply methodologies to provide relevant, practical, and timely contributions to NASA's management of risk.
- d. Establish, implement, and maintain independent risk communication paths within the Agency stressing independent assessment and comprehensive review and understanding of hazards, designs, and their associated risks.
- e. Develop and transfer SMA technologies, processes, and techniques to help program, project, and institution/facility managers improve the likelihood of mission success while reducing overall costs.
- f. Deploy an Agency-wide SMA team that is highly motivated, trained, and properly equipped.

1.3 OSMA implements the following strategies to achieve the overarching goals.

1.3.1 Assist the Mission Directorates in the effective design, development, production, and operation of aerospace systems by accomplishing the following:

- a. Establishing clear SMA requirements in directives, standards, and other appropriate documents within the Agency, negotiating with the Mission Directorates and tailoring requirements to fit the specific application (flight, ground, hardware, software, program, project, research and development, institutions/facilities), and rigorously evaluating and enforcing the application and implementation of these requirements at Headquarters, the Centers, in programs/projects, and at institutions/facilities.
- b. Establishing both qualitative and quantitative methods for formal risk assessment and failure and hazard identification and mitigation for use by Mission Directorate and program/project managers during initial stages of hardware development.
- c. Providing input to safety and reliability assurance plans and products for all mission programs to ensure designs have incorporated the appropriate safety, reliability, quality, and trend and risk analysis requirements before approval.
- d. Partnering with the Office of the Chief Engineer, the Office of the Chief Health and Medical Officer, and the Independent Program Cost and Evaluation Office to develop criteria for governing risk acceptance at critical life cycle milestones by decision makers presiding over Program Management Councils.
- e. Assisting program management in SMA benchmarking and applying SMA lessons learned and best practices to programs and projects.
- f. Supplementing program and project technical problem reporting systems with independent inputs by conducting programmatic and functional compliance audits to assist decision authorities in determining readiness for safe and reliable operations.

g. Promoting sustained excellence in safety, technical performance, customer satisfaction, and quality and productivity by supporting programs such as the George M. Low Award, the Quality and Safety Achievement Recognition (QASAR) Award, and the Space Flight Awareness Flight Safety Award.

1.3.2 Assist the NASA Centers in implementing an effective local SMA program by:

- a. Reviewing and concurring in Center SMA Annual Operating Agreements (AOAs) to ensure that proper resources are planned for Center SMA efforts.
- b. Providing guidance, oversight, and advocacy for, and on behalf of, Center SMA efforts.
- c. Establishing clear SMA requirements in directives, standards, and other appropriate documents within the Agency and providing advice, counsel, and requirement interpretation for Center SMA implementation.
- d. Ensuring communication from Headquarters to the Center SMA community and fostering open dialog throughout the Agency SMA community.
- e. Ensuring that dissenting opinions are given proper attention.

1.3.3 Implement an integrated SMA management process that includes:

- a. Evaluating adequacy of SMA resources.
- b. Assuring compliance with Agency SMA policies and procedural requirements.
- c. Managing, assessing, and improving Agency-wide SMA processes.
- d. Reporting and tracking to resolution corrective actions resulting from investigations of mishaps and close calls and from SMA audits, reviews, assessments (as defined in NPR 8705.6, NASA Safety and Mission Assurance Audits, Reviews, and Assessments); distributing and using lessons learned to improve activities and operations.

1.3.4 Effectively communicate risk issues by:

- a. Advocating risk-informed decision making and continuous risk management to inject the principles and practices of risk management into NASA programs and institutional/facility activities.
- b. Establishing SMA personnel as respected and sought after risk management consultants to Mission Directorate and program/project management.
- c. Improving channels for effective communication of risk between technical authorities and program management.
- d. Maintaining the direct access of Center SMA Directors to their Center Directors.
- e. Maintaining effective communications between the Chief, Safety and Mission Assurance and Center SMA Directors.
- f. Maintaining independent access of Center SMA Directors to the Chief, Safety and Mission Assurance, and subsequent access to the Administrator.
- g. Maintaining an anonymous safety reporting process (the NASA Safety Reporting System) while promoting cultural changes that will reduce the need for anonymous reporting in the future.

1.3.5 Independently assess NASA Mission Directorates, programs, projects, and institutions/facilities by:

- a. Assuring appropriate definition, flow-down, and compliance of Agency SMA policies, requirements, and procedures.

- b. Reviewing and evaluating the risk management processes of developmental and operational programs/projects at milestone reviews and in support of Program Management Council meetings at both Headquarters and Centers.
- c. Implementing the OSMA Safety and Mission Success Review (SMSR) to prepare SMA and engineering management to participate in program/project management pre-operations or major milestone review forums by providing the knowledge, visibility, and understanding necessary for SMA and engineering managers to concur or not to concur in program decisions to proceed. Independently reviewing and evaluating the SMA processes within the Mission Directorates.
- d. Establishing SMA strategies, approaches, and relationships to ensure that SMA can provide value-added support to research and technology development efforts.
- e. Through the IV&V Program, improving safety by performing independent technical assessments, which include testing, analysis, and evaluation, to either identify or assist in the determination of appropriate preventive and corrective actions for problems, trends, or issues pertaining to software within NASA programs and projects.
- f. In support of the Inter-Center Aircraft Operations Panel (IAOP), ensuring reviews are complete, fair, and in accordance with NASA policy.

1.3.6 Identify and sponsor the development of new and innovative SMA technologies and transfer those technologies by:

- a. Working with NASA Mission Directorates, programs, projects, and Centers for the acceptance or more effective use of SMA technologies, tools, and techniques.
- b. Working with other Government agencies, academia, and the commercial sector for the exchange of SMA technologies, tools, and techniques.

1.3.7 Enhance the SMA skills, knowledge, and abilities of NASA personnel by:

- a. Developing, institutionalizing, and continually improving a comprehensive training and career development program for NASA SMA professionals through the SMA Technical Excellence Program (STEP).
- b. Supporting and advancing the SMA technical disciplines and providing training in SMA tools to program, project, and functional management.
- c. Assisting program, project, and functional management personnel in the correct application of safety, reliability, maintainability, and quality tools.
- d. Committing SMA organizational resources for SMA skills training and career development.

1.3.8 Execute SMA Technical Authority by:

- a. Managing relevant SMA technical requirements and standards (including the authority to grant requests for relief from these requirements and standards) to ensure safe and reliable operations.
- b. Providing formal concurrence in decisions related to application and tailoring of SMA technical requirements. This concurrence is based on the technical merits of the case and includes agreement that the risk is acceptable. (The risk is formally accepted by the applicable program, project, operations, or facility manager.)
- c. Ensuring that any dissenting opinions with regard to SMA technical requirements are formally processed through NASA's dissenting opinion process for decision by higher level management.

- d. Working in collaboration with a cadre of Chief SMA Officers at the Centers who are delegated to execute SMA Technical Authority responsibilities for Center programs, projects, and local operations.
- e. In coordination with the Office of the Chief Engineer and the Office of the Chief Health and Medical Officer, implement processes that provide the capability to independently make technical decisions with a voice equal, in technical matters, to that of programs and projects.

## Part 2: Organization and Interfaces

### 2.1 OSMA Overview

2.1.1 OSMA has functional responsibility for the prescription and proper application of SMA processes for all NASA programs, projects, and institutions. The Chief, Safety and Mission Assurance reports to the NASA Administrator. By design, this office is independent of the NASA program and project offices, thus able to provide non-advocate assessments of safety and effectiveness of NASA programs and projects.

2.1.2 OSMA has an organizational structure consisting of a front office, three operating elements within Headquarters (the Safety and Assurance Requirements Division, the Mission Support Division, and the Resources Management Office), the NASA Safety Center, the IV&V Facility, senior advisors, and advisory panels.

2.1.3 The NASA Center SMA offices functionally report (are "dotted-lined") to OSMA for leadership and guidance in the technical SMA areas. Center SMA offices support the Center Director, using SMA tools and techniques to provide assistance, guidance, and assessment of Center-based programs, projects, and operations. Chief SMA Officers at the Centers provide SMA support to programs and projects and implement SMA Technical Authority at the program, project, or facility level on behalf of the Chief, Safety and Mission Assurance. The NASA Engineering and Safety Center is also "dotted-lined" to the Office of Safety and Mission Assurance. The NASA Engineering and Safety Center serves as a major Agency-wide technical resource focused on engineering excellence supporting the safety and success of NASA missions.

2.1.4 OSMA has full authority over the content and budget of multi-Center programs that directly support NASA's SMA efforts. These programs are referred to as delegated programs and are comprised of the following: Range Safety, Orbital Debris Program, Payload Safety, Non-Destructive Evaluation, Metrology and Calibration, Workmanship, NASA Electronic Parts Program, the Software Assurance Research Program, and the NASA Safety Center. These programs are managed by OSMA (Headquarters) Program Executives and Center Delegated Program Managers who work closely together to assure the Agency's goals and objectives for their respective projects are appropriately achieved. See Appendix A for details about the responsibilities of Program Executives and Program Managers.

### 2.2 OSMA Operating Elements Resident at Headquarters

2.2.1 The Safety and Assurance Requirements Division provides the corporate leadership in the definition and implementation of NASA's Agency-wide SMA policies, procedures, and standards. The Division provides policy and requirement interpretations and expertise to enable the proper implementation of SMA requirements, tools, and techniques in Mission Directorate and institutional/facility activities. The Safety and Assurance Requirements Division provides requirements expertise to the NASA Centers' institutions/facilities and programmatic independent assessments. In addition, this Division is responsible for Agency support in the development and application of methods and processes for system safety, operational safety, institutional/facility safety, reliability and maintainability, software safety, risk assessment and management, safety culture, and quality assurance.

2.2.2 The Mission Support Division provides the primary interface with the NASA Mission Directorates (and their programs) and the Center SMA organizations. This Division assists its customers in understanding SMA policy and guidelines and provides oversight and guidance for programs and projects and the institutions in implementing SMA requirements. Division staff members provide direct, point-of-contact support to each Mission Directorate and each Center SMA organization as well as major programs and major program areas. Staff members work with their counterparts at the Centers to ensure mission success and assist the mission of the other OSMA offices and organizations as needed and promote communication between OSMA offices, the Centers, Mission Directorates, and programs/projects. The Division also provides the AOA guidance and, through this annual process, assists Agency management in the understanding of the efficacy of Center SMA assurance products and functions through documented metrics.

2.2.3 The Resources Management Office provides the primary interface with mission support organizations responsible for budget, procurement, human capital, operations and administration, communications, public affairs, and internal controls and management systems. This Office is responsible for developing and implementing processes for the formulation of the OSMA corporate budget and training and travel budgets and for monitoring the execution of the OSMA corporate budget and the OSMA training and travel budgets. The Office provides a range of administrative, correspondence, and logistic support to OSMA, including action tracking, personnel, directives management, coordination of Freedom of Information Act requests, Office of the Inspector General/Government Accountability Office audit liaison activities, and coordination with the Office of International and Interagency Relations on Aerospace Safety Advisory Panel reviews. The Resources Management Office administers the George M. Low and QASAR Award programs and the Flight Safety Award.

### 2.3 OSMA Operating Elements Outside of Headquarters

2.3.1 The IV&V Program provides independent evaluation of safety and mission critical software products and processes across the development life cycle. The IV&V Program has also been delegated management responsibility for the Software Assurance Research Program. The Software Assurance Research Program develops new methodologies and techniques to be transferred into practice to enhance the performance of software assurance activities.

2.3.2 The NASA Safety Center supports the Agency's SMA program by focusing on improving the development of tools, processes, and personnel needed for the safe and successful achievement of NASA's strategic goals. The NASA Safety Center is comprised of four functional offices: Technical Excellence, Knowledge Management, Audits and Assessments, and Mishap Investigation Support. The Technical Excellence Office develops and deploys structured training to professional disciplines within the SMA community while supporting technical excellence through those disciplines. The Knowledge Management Office facilitates communication and collects and shares information through the development and hosting of web-based applications and products. The Audits and Assessments Office performs coordinated program, project, and institutional/facility audits and reviews. The Mishap Investigation Support Office assists mishap investigators as they perform investigations and determine an incident's root cause.

## 2.4 OSMA Senior Advisors

2.4.1 The Senior Safety and Mission Assurance Manager provides functional oversight of the SMA independent assessment activities within the NASA Centers and communication, liaison, and policy integration between OSMA and the NASA Safety Center, the NASA Engineering and Safety Center, the IV&V Program, the Office of the Chief Engineer, and the Office of the Chief Health and Medical Officer to assure a consistent and unified approach to safety and mission success. The Senior Safety and Mission Assurance Manager leads SMA benchmarking activities.

2.4.2 SMA Technical Fellows provide technical discipline expertise in the development of discipline specific policy, requirements, technical procedures, and training curricula. There are four SMA Technical Fellows, one in each of the following disciplines: System Safety, Quality Engineering, Reliability and Maintainability, and Software Assurance. SMA Technical Fellows establish and maintain a dialog across the Agency with discipline practitioners, assess the state of the discipline, and work to advance the state of the discipline and to solve technical problems in the discipline area. SMA Technical Fellows are considered to be the Agency's expert in the discipline, and they provide advice and guidance to the Chief, Safety and Mission Assurance and other Agency leaders on matters pertaining to their area of expertise.

## 2.5 Advisory Panels and Boards

The following advisory bodies advise the Chief, Safety and Mission Assurance:

2.5.1 The Interagency Nuclear Safety Review Panel provides an independent evaluation of the radiological risks associated with the launch of a nuclear power system. The Panel members, or coordinators, representing the Department of Defense, Department of Energy, U.S. Environmental Protection Agency, U.S. Nuclear Regulatory Commission, and NASA, are independent of the program under review.

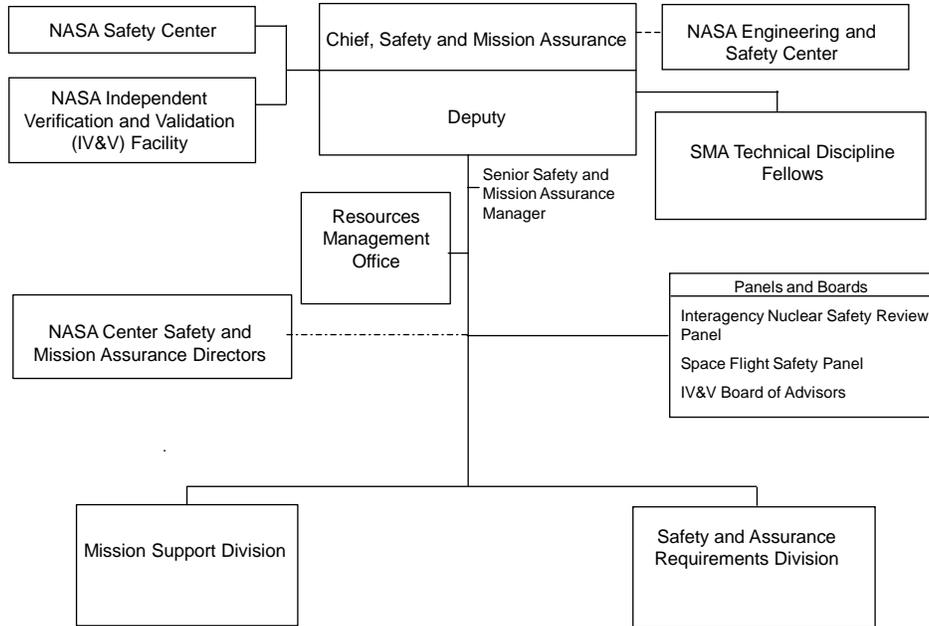
2.5.2 The Space Flight Safety Panel ensures that safety issues and recommendations are (1) identified and assessed during the development and implementation of NASA space flight programs, and (2) addressed in subsequent technical and management decisions. The Panel independently assesses the NASA space flight safety program, conducts panel (or independent member) reviews of selected issues or concerns, solicits and responds to space flight safety concerns, and provides an independent assessment of safety issues.

2.5.3 The IV&V Board of Advisors supports the Chief, Safety and Mission Assurance in determining to which NASA programs and projects the Software IV&V resources should be applied. It also can make recommendations to the Chief, Safety and Mission Assurance on the amount of Agency funding that should be provided on each project for software IV&V support.

2.6 The OSMA organization chart is shown in figure 2-1 below. Each OSMA element interfaces with the others to execute a comprehensive SMA program, as depicted in paragraph 2.7, table 2-1.

Figure 2-1 – OSMA Organization Chart

Office of Safety and Mission Assurance



## 2.7 OSMA Internal Interfaces

The following table identifies, at a high level, responsibilities of each organizational entity for primary OSMA activities.

In this table, the following abbreviations are used:		
ASAP - Aerospace Safety Advisory Panel	GAO - Government Accountability Office	IG - Office of Inspector General
IV&V - NASA IV&V Facility	NESC - NASA Engineering and Safety Center	NSC - NASA Safety Center
OCE - Office of the Chief Engineer	OCHMO - Office of the Chief Health and Medical Officer	PRA - Probabilistic Risk Assessment
SARD - Safety and Assurance Requirements Division	SMA - Safety and Mission Assurance	STEP - SMA Technical Excellence Program

Table 2-1. – OSMA Interfaces

	OSMA Chief and Deputy Chief	SMA Technical Fellows	Senior SMA Manager	Resources Management Office	Safety and Assurance Requirements Division	Mission Support Division	NASA Safety Center	IV&V Program
Policy and Requirements Development	Overarching Guidance  Executive Decision making	Discipline Specific Input	Negotiate any needed interface with OCE and OCHMO	Directives Management  Office of the Chief Financial Officer Interface  Office of Human Capital Management Interface	Lead for Policy Development	Input to Requirement Revisions  Recommendations for Requirements changes as a result of interface with Mission Directorates, Programs, Projects, and Centers	Input to Requirement Revisions based on Audit Findings  Input to Requirement Development in Areas of Expertise (Audits, Mishap)	Input to software requirements
Budget Development	Overarching Guidance  Executive Decision making	Develop budget request for discipline specific programs.	Advice on IV&V budget	Lead to develop and issue budget planning and execution guidance  Monitor OSMA travel and training budget	Develop budget request for programs under Division purview.  Monitor budget execution for individual programs	Develop budget request for programs under Division purview.  Monitor budget execution for individual programs	Develop NSC budget submission and execute	Develop IV&V budget submission and execute

	OSMA Chief and Deputy Chief	SMA Technical Fellows	Senior SMA Manager	Resources Management Office	Safety and Assurance Requirements Division	Mission Support Division	NASA Safety Center	IV&V Program
	Adjudication of disagreements	Monitor budget execution for discipline specific programs.		Monitor Center SMA budget use  Assist Program Executives in financial planning	Manage within allocated program, travel, and training budget	Manage within allocated program, travel, and training budget		
Training	Overarching Guidance  Executive Decision making Adjudication of disagreements	Lead for developing technical excellence curricula and training in area of discipline expertise.	None	Monitor OSMA Training Budget	Partner with NSC to develop training for STEP. Develop and conduct training in areas of specialty (PRA, risk assessment, mishap investigation, etc.)  Work with NSC to identify and fill gaps in training.	Provide feedback to training developers on how training is received by Programs and Centers and where there may be gaps in training.	Develop and implement the modules of the STEP program.  Assimilate feedback received to improve SMA coursework.  Work with SARD to improve STEP content.  Provide online information, cases studies, community best practices.	Identify needed training for IV&V; coordinate with Goddard Space Flight Center, NSC, and SARD as appropriate to obtain training
Oversight	Overarching Guidance  Executive Decision making  Adjudication of disagreements	Oversight of performance in discipline specific areas.	Oversight of IV&V, NSC, SMA Independent Assessments	Oversight of OSMA Budget Performance  Oversight of OSMA Personnel Actions	Oversight for the implementation of institutional/facility safety requirements.	Oversight for Mission Directorates, Office of the Chief Technologist, programs, projects, and Center SMA	(See Audit & Assessment)	Oversight of program software IV&V functions.

	OSMA Chief and Deputy Chief	SMA Technical Fellows	Senior SMA Manager	Resources Management Office	Safety and Assurance Requirements Division	Mission Support Division	NASA Safety Center	IV&V Program
Guidance	<p>Overarching Guidance</p> <p>Executive Decision making</p> <p>Adjudication of disagreements</p>	Agency-wide advice in discipline area	<p>Guidance for IV&amp;V, NSC, SMA Independent Assessments</p> <p>Advise OCE on areas of mutual interest.</p>	Guidance for Budget, Personnel, IG/GAO Audits	Advice and Guidance in Institutional Safety and Risk Management to Programs and Centers	<p>Advice and Guidance SMA requirements implementation for Mission Directorates, Programs, Projects, and Centers.</p> <p>Advice on launch readiness.</p>	<p>Advice to Centers and programs on SMA requirements implementation based on findings from audits.</p> <p>Guidance on implementation of mishap investigation process.</p>	Guidance for implementation of IV&V for programs and projects
External Interface	<p>Overarching Guidance</p> <p>Executive Decision making</p> <p>Adjudication of disagreements</p>	Represents NASA in areas of technical expertise	Provides primary OSMA interface with OCE, NESC, IV&V, OCHMO	Provides primary OSMA interface for resources, personnel, and administrative management; ASAP, IG/GAO audits.	<p>Primary OSMA interface for institutional/facility safety, PRA, and risk management.</p> <p>Primary OSMA interface with OCHMO</p>	Primary interface with Mission Directorates, Programs, Projects, and Center SMA directorates.	<p>Interface with education community</p> <p>Coordination with other NASA audit and assessment programs</p>	Interface with software community.
Audit & Assessment	<p>Overarching Guidance</p> <p>Executive Decision making</p> <p>Adjudication of disagreements</p>	Provide audit expertise for technical discipline	Conducts benchmarking and conveys best practices.	Organizes OSMA participation in IG/GAO audits	<p>Provides expertise to audits and assessments</p> <p>Modifies policy/requirements based on audit results</p>	<p>Provides expertise (as needed) for audits and assessments.</p> <p>Provides feedback from auditees back to the auditor.</p>	<p>Lead for SMA audits, reviews, and assessments.</p> <p>Coordinate with other OSMA organizations, Mission Directorates, Programs, Projects, and Centers.</p>	Participate in audits reviews as desired.

## 2.8 OSMA Support to the Mission Directorates. OSMA provides the Agency with the following:

- a. Policy, requirements, and standards, and assistance in interpreting and tailoring these documents to meet Mission Directorate needs.
- b. Assessment of Center SMA processes, capabilities, and resources.
- c. Assurance for the proper implementation and application of continuous risk management.
- d. Tools for safety and reliability risk assessment (fault tree analysis, failure modes and effects analysis, probabilistic risk assessment, and others).
- e. Training in SMA and safety management system topics.
- f. Support for mishap investigations

## 2.9 OSMA Relationship with Center SMA Organizations

2.9.1 Each NASA Center has an independent SMA office; each serves to function as a counterpart of the Agency-level organization. OSMA works through the Center SMA offices to accomplish much of its mission. OSMA holds quarterly face-to-face meetings with all the Center SMA directors, disseminates information to the Centers on a regular basis, maintains open communications with all Center SMA offices, and provides easy access to Agency SMA information via its website.

2.9.2 The OSMA AOA activities assure that Centers have the proper focus and resources to perform their assurance role. AOAs are Center SMA management plans, focused on customers for SMA products and services. AOAs establish the planning and execution processes to assure available SMA resources are allocated to optimize risk reduction. Each NASA Center SMA office must develop an AOA that spells out, in detail, the SMA products and services that will be provided by the Center SMA office, and what resources will be necessary to provide the products and services. AOAs are considered to be a negotiated agreement among Center SMA customers, other Center organizations responsible for performing the safety compliance functions, the SMA organization, and the Center Director. Each AOA is approved and signed by the Center SMA Director and Center Director, and then endorsed by the Mission Support Division and concurred on by the Chief, Safety and Mission Assurance, Associate Administrator for Mission Support Directorate, and Associate Administrator.

2.9.3 OSMA periodically conducts institutional/facility and functional audits and reviews to analyze Center SMA functions against Agency requirements and the Center AOA. Reports documenting the results of audits and reviews at each Center are provided to the appropriate Center Director, the Center SMA Director, and the Chief, Safety and Mission Assurance. These results are also shared with the other Center SMA Directors and, when appropriate, Mission Directorate Associate Administrators.

## 2.10 Interface with Other Headquarters Offices. OSMA interfaces extensively with other NASA Headquarters Offices in the conduct of day-to-day business, including:

- a. Providing program/project as well as engineering and systems management policy, advice, and direction on a variety of issues.
- b. Participating in various Mission Support councils, boards, and working groups.
- c. Working with the Office of Procurement in acquisition/procurement strategies and SMA content in contracts and grants.
- d. Working with the Independent Program Cost and Evaluation Office in preparing for Baseline Performance Reviews.
- e. Working with the Office of the General Counsel on contractor indemnification, mishap reporting, investigating, and record keeping, and other related matters.

f. Working with the Office of International and Interagency Relations on responding to Aerospace Safety Advisory Panel recommendations.

2.11 Councils, Boards, and Working Groups. The Chief, Safety and Mission Assurance participates in Agency-wide councils, boards, and working groups or delegates his/her position. A brief description of these is provided below:

2.11.1 The Strategic Management Council (SMC) serves as the Agency's senior decision-making body for strategic direction and planning. The SMC determines NASA's strategic direction and assesses Agency progress toward achieving NASA's vision.

2.11.2 The Mission Support Council serves as NASA's senior decision-making body for institutional/facility plans and implementation strategies. The council determines and assesses mission support requirements to enable the successful accomplishment of the Agency's mission.

2.11.3 The Program Management Council (PMC) serves as the Agency's senior decision-making body to baseline and assess program/project performance and ensure successful achievement of NASA strategic goals. (OSMA also supports Delegated Program Management Councils to support preparation for the PMCs or as tasked by the PMC.)

2.11.4 The Baseline Performance Review (BPR) is the Agency's forum for performance management of its programs/projects and mission support functions and is results-oriented. The BPR serves as NASA's senior management monthly review of performance integrating vertical and horizontal Agency-wide communication of performance metrics, analysis and independent assessment. The BPR encompasses all mission activities including spaceflight operations, exploration systems, aeronautics and science. The forum is designed to be actionable, supporting the Agency decision-making councils.

2.11.5 Health and Safety Board (HSB) serves as a forum to address critical occupational health and safety concerns relating to the NASA workforce in all environments (ground, air, and space) and involves the relationship between humans, systems, and the environment. The HSB reviews clinical, health maintenance, and environmental health evidence in support of improving the Agency's health and safety policies and procedures, identifies knowledge gaps, and evaluates the adequacy of tools to maintain a workforce at its highest level of physical and mental well-being.

2.11.6 The Flight Planning Board provides a forum for addressing NASA orbital space launch requirements, issues, and priorities for all NASA and NASA-sponsored payloads. The Board is chartered to (1) develop and maintain under configuration control the NASA Expendable Launch Vehicle (ELV) mixed-fleet manifest that best meets the requirements and capabilities of the Agency including mission launch vehicle assignment, launch date, and launch site; (2) provide a forum for resolving launch queue priority issues for all NASA and NASA-sponsored orbital space launch missions; (3) provide Authority-to-Proceed direction to the Launch Services Program (LSP) for significant contractual actions on the launch services contracts maintained by the LSP; and (4) ensure compliance with NASA launch service risk mitigation and vehicle assignment policies.

2.11.7 The Engineering Management Board (EMB) serves as a focus for continual improvement of engineering activities within NASA through the continuous capture, dissemination, and utilization of corporate knowledge gleaned through internal Agency activities, as well as through benchmarking activities of external organizations. Approximately twice a year the EMB and the SMA Directors hold a combined meeting to discuss mutual concerns.

## 2.12 OSMA Interface with the Office of Chief Engineer

2.12.1 The NASA Office of the Chief Engineer has primary responsibility for the overall technical standards program within NASA and is the responsible office for NPD 7120.4, NASA Engineering and Program/Project Management Policy, NPR 7120.5, NASA Space Flight Program and Project Management Processes and Requirements, and NPR 7120.8, NASA Research and Technology Program and Project Management Requirements. OSMA develops NASA standards and adopts preferred voluntary consensus standards under the authority provided in NPD 7120.4 and works with the Office of the Chief Engineer to:

- a. Assist in the establishment of the overall technical standards program requirements.
- b. Maintain linkages from the master OSMA library of SMA standards with the Agency's Technical Standards Program homepage.
- c. Ensure that standards development and adoption activities of the two organizations complement each other.
- d. Ensure proper SMA integration into program and project processes.

2.12.2 OSMA works collaboratively with the Office of the Chief Engineer to ensure that safety contributes to engineering mission success throughout the Agency.

2.12.3 OSMA, along with the Chief Health and Medical Officer, collaborates with the Office of the Chief Engineer in the development of the Agency's Technical Authority roles, responsibilities, and processes.

## 2.13 OSMA Interface with the Office of Chief Health and Medical Officer

2.13.1 OSMA works with the Office of the Chief Health and Medical Officer on policy, procedures, and standards involving occupational safety and health.

2.13.2 As the Designated Safety and Health Official, the Chief Health and Medical Officer is responsible for coordinating and obtaining approval from the Secretary of Labor for waivers or alternate standards from Occupational Safety and Health Administration.

2.13.3 OSMA, along with the Chief Engineer, collaborates with the Office of the Chief Health and Medical Officer in the development of the Agency's Technical Authority roles, responsibilities, and processes.

### **Part 3: Agency Safety Metrics**

3.1 The NASA Safety Center maintains current and trend data to track mishaps, close calls, and lost time injuries and illnesses. This data can be found on the NASA Safety Center web page at:  
<http://nsc.nasa.gov/KnowledgeManagement/Metrics.aspx>.

3.2 Cumulative Monthly Safety Metrics typically include:

- a. 12-Month Safety Metrics Roll Up
- b. FY Safety Metrics Roll Up
- c. Monthly Safety Metrics
- d. Calendar Year Safety Metrics
- e. Reported Class C Mishaps for the month
- f. Open Class A and B Mishaps in the Incident Reporting Information System

3.3 Agency Mishap Posture Metrics include:

- a. Active NASA Type A/B and High-Visibility Mishap Investigations
- b. Type A-D Mishaps
- c. Activity at Time of Mishap
- d. Mishap Damage Costs
- e. Mishap Damage Class – Frequency vs. Cost
- f. Summary of Recent Mishap Damage Costs
- g. Type A-D Injury/Illness Mishap Events/Exposures
- h. Type A-D Injury/Illness Mishap Consequences
- i. Agency Injury Rates
- j. Agency Lost Time Severity Rates

3.4 Agency Performance Goals

3.4.1 OSMA is a contributor to the Agency's Safety and Mission Success (SMS) program that administers and refines policies, procedural requirements, and technical standards for NASA. SMS program activities are a key component of the forums that provide advice to the Administrator, Administrator Staff Offices, Mission Directorates, Mission Support Offices, Program Managers, and Center Directors who are ultimately accountable for the safety and mission success of all NASA programs, projects, and operations. The SMS program provides an effective NASA Engineering and Safety Center, NASA Safety Center, and NASA IV&V Facility as established and recognized components of a comprehensive response to lessons learned from NASA's greatest tragedies. These organizations form a basis for a disciplined execution of safety, reliability, quality, and system engineering needed for the successful pursuit of NASA's missions.

3.4.2 As a key component of the SMS program, OSMA measures progress for SMS Agency Performance Goals. (See NASA's Performance Plan on the Office of the Chief Financial Officer's website at [http://www.nasa.gov/offices/ocfo/budget/strat\\_plans.html](http://www.nasa.gov/offices/ocfo/budget/strat_plans.html).)

## Part 4. OSMA Key Work Activities and Internal Controls

In accordance with the Government Accountability Office’s Standards for Internal Control in the Federal Government and NASA policy, OSMA conducts a self assessment of the effectiveness of internal controls. OSMA reviews a number of activities as part of this assessment, including processes and products associated with performance planning and appraisal; requirements development and promulgation; education, training, and communication; audits, assessments, and reviews; mishap reporting, investigating, and recordkeeping; and software independent verification and validation. The information from the FY 2010 Statement of Assurance assessment is as follows:

Control Environment: 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. Safety is established as a core value at NASA, documented in NPD 1000.0, "Safety—NASA’s constant attention to safety is the cornerstone upon which we build mission success. We are committed, individually and as a team, to protecting the safety and health of the public, our team members, and those assets that the Nation entrusts to the Agency." NPD 8700.1, NASA Policy for Safety and Mission Success, states that it is NASA policy to protect the public, NASA workforce, high-value equipment and property, and the environment from potential harm as a result of NASA activities and operations by factoring safety as an integral feature of programs, projects, technologies, operations, and facilities. By policy, line managers have the overarching responsibility for the safety of employees and assets. Safety and Mission Assurance (SMA) leadership is selected and evaluated based on criteria that emphasize high competence, integrity, and ethical tone, safety-focused management philosophy, and operating style that is consistent with a positive control environment. There is strong leadership for integrity of SMA activities, requirements, and processes.

<b>Work Activity (Key Control): 1. Hold NASA leaders, managers, supervisors, and employees accountable for safety and mission success within their functional areas of responsibility (NPD 8700.1, para. 1.c.).</b>				
<b>Work Activity: SMA Leadership</b>				
<b>The major risks are death, injury, significant damage to systems or property, or loss of mission.</b>				
<b>Initial Rating: High</b>				
<b>Risk Assessment: Without appropriate authority, accountability, resources, and training, NASA does not have the capability to incorporate safety as an integral feature of programs, projects, technologies, operations, and facilities. This lack of capability increases the likelihood of mishap.</b>				
<b>Control Activity</b>	<b>Information and Communications</b>	<b>Monitoring</b>	<b>Assessment Method</b>	<b>Assessment Results</b>
Provide to each Center Director a written evaluation of the performance of the principal SMA official which will be attached to each individual's annual performance appraisal (NPD 1000.3, para. 4.6.2.1.c).	Data is collected from OSMA staff members during the course of the year and the Chief, Safety and Mission Assurance provides an integrated single input to the appropriate supervisor.	On an annual basis, Center Directors review of input provided by the Chief, Safety and Mission Assurance; SMA input is attached to the formal performance appraisal for the record.	Review of records to determine whether this action was completed.	OSMA assembled data for each of the Center SMA Directors and other key personnel and provided independent assessments to the rating officials in conjunction with the annual Agency Employee Performance Ratings. The Chief, OSMA has met all requirements for executive planning, midterm evaluation, and final evaluation for the SMA managers who are his direct reports at Headquarters, the Director, NASA Safety Center; and the Director, Independent Verification and Validation Facility.

<p>Review and concur with each Center's SMA Annual Operating Agreement (AOA). (NPD 1000.3, 4.6.2.1.e., 4.6.2.1.k)</p>	<p>OSMA issues a call for the AOAs. (AOAs document Center SMA plans and expected resource needs.)</p>	<p>Center Directors , the Chief, Safety and Mission Assurance, and the Associate Administrator concur in the SMA AOAs.</p>	<p>Examination of status of the AOA process. Also, this process was audited by the Internal Controls and Management Systems Office in September 2009. No findings were reported.</p>	<p>The AOAs for 2010 have been submitted and are complete. OSMA provided endorsements for each of the AOAs to identify positives in the AOA, gaps in the AOA, and to augment missing information. The learned lessons from last year's process and feedback from the Internal Controls and Management Systems audit were incorporated and succeeded in improving the process.</p>
<p>Direct the suspension of any activity that presents either a present hazard (imminent danger) or future hazard to personnel, property, or mission operations due to unsafe acts or conditions that might be identified by either inspection or analysis (NPD 1000.3, para. 4.6.2.2; NPD 8700.1, para. 5.c(2)).</p>	<p>Notice of Unsafe or Unhealthful Condition (NF 1390) is issued in accordance with NPR 8715.1. Also, the requirement and responsibility to direct suspension of activity that presents a present or future hazard due to unsafe acts or conditions is included in several other SMA Technical Authority requirements documents. The NASA Safety Center issues Mishap Warning-Action-Response (MWAR) notifications when information discovered during the course of a mishap investigation indicates a potential safety hazard.</p>	<p>This requirement is audited through OSMA audit procedures and evaluated as part of the mishap investigation process.</p>	<p>Review of audit results and recommendation to Center Director regarding the stoppage of work for any catastrophic non-compliance. Review of MWAR notifications issued.</p>	<p>OSMA &amp; NASA Safety Center have tracked hazardous findings and initiated efforts to assure proper corrective actions through Institutional/Facility/Operational and Institutional Programmatic Support audits (replaced with Quality Audit, Assessment, and Review activities and Requirements Flow-down and SMA Engineering Design Audits and Assessments). The goal is to issue final reports within 60 days of an audit. The NASA Safety Center will also review the Center corrective action plans (submitted in response to final audit reports) and provide feedback to improve the corrective action plan's content. Also NASA Safety Center has instituted a notification process to get the word out across the Agency when hazards are identified by Mishap Investigation Teams that may impact other operations. Since the NASA Safety Center has worked with mishap investigation boards on this effort, nearly two dozen Alerts and MWAR notifications have been issued since the beginning of FY 08, eleven MWAR notifications were issued in 2010.</p>

<p>Formulate and direct Safety, Reliability, Maintainability, and Quality (SRM&amp;Q) education, training, and career development programs to enable SMA staff, program/project management, senior Agency management, and the NASA workforce to obtain the understanding of SRM&amp;Q principles, tools, methods, and standards necessary to successfully perform their functions (NPD 8700.1, para. 5.c.(1)(d)).</p>	<p>Annual training needs survey is conducted to identify training to be developed or updated. Complete set of available courses is available on SATERN. OSMA employees are informed of training opportunities. SMA managers are able to assign training to SMA practitioners through SATERN.</p>	<p>The NASA Safety Center and OSMA assessment of the results of the training survey.</p>	<p>Verification of completion of training survey. Review of participation and feedback from SMA training.</p>	<p>FY11 assessment has been completed. Feedback is being compiled into the FY 11 NASA Safety Training Center Training Plan.</p>
<p>Develop and implement a SMA Technical Excellence Program (STEP) that contains discipline-specific training and professional development requirements for the SMA community. Provide tools and methodologies for course delivery (NPD 1000.3, para. 5.13.2.1, NPD 8700.1, para. 5.c.(1)(d)).</p>	<p>Course updates and notices provided through SATERN.</p>	<p>The NASA Safety Center vets the STEP across a broad range of contributing participants from all NASA Centers and Headquarters. The program is formally reviewed by the SMA Directors.</p>	<p>Assessment of independent review team (IRT) findings.</p>	<p>The NASA Safety Center received authority to proceed from the Chief, Safety and Mission Assurance based on his review and IRT feedback. STEP Level 1 Rollout was completed on Sept. 3, 2009; 982 SMA civil service employees have completed Level 1 curriculum, with over 22,000 hours of training accomplished within the first 8 months. The Chief, Safety and Mission Assurance and IRT have approved the rollout of STEP Levels 2-4 for all six disciplines, but funding may drive our capability to complete the curricula within the timeframe we had previously anticipated.</p>
<p>Provide oversight for the operation of the NASA Independent Verification and Validation Facility and the NASA Safety Center (NPD 1000.3, para. 4.6.2.1.m and 4.6.2.1.n)</p>	<p>The Director, Independent Verification and Validation Facility and the Director, NASA Safety Center, report to the Chief, OSMA.</p>	<p>Weekly staff meeting includes the NASA Safety Center and the Independent Verification and Validation Facility. Performance planning and evaluations are conducted by the Chief, Safety and Mission Assurance. OSMA exercises planning and oversight for budgets for the Independent Verification and Validation Facility and NASA Safety Center. The Independent Verification and Validation Facility also has an Agency Board of Advisors.</p>	<p>Review of progress against Independent Verification and Validation Facility and NASA Safety Center objectives. Feedback from external reviews.</p>	<p>NASA Safety Center Director (or designee) and the Independent Verification and Validation Facility Director (or designee) participate in OSMA weekly staff meetings. NASA Safety Center and Independent Verification and Validation Facility provide periodic financial and program status to OSMA. The OSMA Senior SMA manager provides very close interface with both the NASA Safety Center and the Independent Verification and Validation Facility.</p>

				In addition, the Chief, OSMA personally maintains good communication with the NASA Safety Center and Independent Verification and Validation Facility Directors.
Plan and manage OSMA to support NASA's strategic planning objectives, operate effectively, manage risk, and meet institutional requirements (NPD 1000.3, para 4.6.2.1.a).	OSMA activities and the linkage to NASA's Strategic Plan are communicated via policies, requirements, and performance plans. OSMA managers use the Headquarters Action Tracking System to track actions and ensure timely completion. OSMA staff are informed of institutional requirements (such as information technology and physical security procedures and mandatory training) by e-mail and through staff meetings.	Actions are tracked through the Headquarters Action Tracking System. OSMA managers monitor staff progress throughout the year.	Review of staff performance plans. Review of external scrutiny (e.g., Aerospace Safety Advisory Panel, Inspector General, Government Accountability Office reviews). Periodic review of progress of projects and activities. Review of OSMA success in complying with operational requirements.	Performance plans are reviewed and updated annually to ensure alignment with strategic objectives. All institutional mandatory training has been taken. The Headquarters Action Tracking System is used to track actions to completion. It is challenging for OSMA to keep up with the large number (and frequency) of actions, briefings, and prebriefings assigned to OSMA by internal Headquarters and Agency reviews and external groups such as the Aerospace Safety Advisory Panel. OSMA has had to prioritize the response to the actions and taken additional measures including reassigning staff from their regular assignments to deal with the review actions. OSMA is working on a process to improve the management of these actions.

<p>Allocate and maintain appropriate resources necessary to implement NASA's SMA activities (NPD 1000.3, para. 4.6.2.1.b, 4.6.2.1.k).</p>	<p>Annual budget guidance and budget decisions are used to inform all parties of resource decisions. OSMA requests assessments on adequacy of program and institutional SMA funds. OSMA also reports monthly to an Agency resource review.</p>	<p>OSMA tracks budget and reprograms funds when necessary.</p>	<p>Review of results of data call regarding adequacy of resources. Review of budget requests and shortfalls. Review of current OSMA funds usage. Review of COTR practices and contractor performance. Review of adequacy of OSMA staffing.</p>	<p>OSMA provides annual budget guidelines to all NASA Centers and Delegated Program Managers. Budget decisions are made based upon Center responses to the guidelines and Agency programmatic priorities. OSMA instituted mandatory quarterly reviews by all of the Budget Program Managers. OSMA is using the quarterly reviews to adjust disbursements based on costing to reach Agency targeted metrics. NASA Safety Center and Independent Verification and Validation Facility budgeting is effective, and OSMA is currently meeting the Agency-level costing requirements.</p>
<p>Document responsibilities for all levels of NASA with regard to safety and mission success (NPD 1000.3, para. 4.6.2.1.f, NPD 8700.1, para. 1.c).</p>	<p>Authority and responsibilities are defined within various NASA directives.</p>	<p>Directives are reviewed on a regular schedule. Out of cycle updates are processed when necessary.</p>	<p>Review of directives.</p>	<p>OSMA continued to manage its SMA Technical Authority requirements and ensure that directives are reviewed on a regular schedule and updated as needed. (See discussion under Work Activity 2.) OSMA is continuing its efforts to clarify roles, responsibilities, and the scope of the technical authorities and document these responsibilities and requirements within Agency-level Directives.</p>

<b>Work Activity (Key Control) 2. Establish a framework for safe and successful missions and operations through the promulgation of safety, reliability, maintainability and quality requirements. (NPD 1000.3, para. 4.6.2.1.f, NPD 8700.1, para. 1.d)</b>				
<b>Work Activity: Safety, reliability, maintainability, and quality engineering and assurance requirements (herein after abbreviated as SMA requirements). (NPD 1000.3, para. 4.6.2.1.f)</b>				
<b>Major Risk: Death, injury, significant damage to systems or property, or loss of mission.</b>				
<b>Initial Rating: High</b>				
<b>Risk Assessment: SMA requirements, thoughtfully developed and properly applied, are the cornerstone of safe and successful requirements. Lack of SMA requirements increases the potential for mishap.</b>				
<b>Control Activity</b>	<b>Information and Communications</b>	<b>Monitoring</b>	<b>Control Assessment Method</b>	<b>Assessment Results</b>
Develop strategies, policies, procedures, guidelines, and standards for SMA requirements (NPD 1000.3, para. 4.6.2.1.f)	OSMA Headquarters Office Work Instruction (HOWI) 1410-GD02 documents the process within OSMA, NPR 1400.1 documents the process for Agency directives. SMA requirements are readily available on OSMA's web site.	NASA Online Directives Information System managers monitor the process for Agency-level directives. OSMA staff monitor the process for developing documents through the SMA drafts page.	OSMA was audited on this process by the Office of Internal Controls and Management Systems in January 2009; no findings were reported.	OSMA continues a strong effort to maintain current requirements.
Provide the opportunity for input from Centers and Headquarters Offices on SMA requirements prior to publication (NPD 1000.3, para. 4.6.2.1.f)	OSMA drafts page allows reviewers to see what documents are being reviewed and to see the results of the reviews. The NODIS Document Management System provides for Agency-level review of directives.	Policies/procedures/standards in work are provided to subject matter experts prior to approval. Completed documents are posted on the web.	OSMA was audited on this process by the Office of Internal Controls and Management Systems in January 2009; no findings were reported. The process has continued to run smoothly.	OSMA's HOWI 1410-GD02 is comprehensive and is consistently applied. It provides for full Agency discipline review of draft requirements documents prior to entering signature reviews. Results of discipline reviews are accessible to all reviewers to ensure transparency in requirements development. OSMA is in compliance with NASA-established processes.
Review SMA requirements on a standard schedule, update out of cycle if needed (NPD 1000.3, para. 4.6.2.1.f).	OSMA HOWI 1410-GD02 and NPR 1400.1 provide the requirements for completing this activity. Updates are processed in accordance with OSMA HOWI 1410-GD02 and NPR 1400.1	Document owners process updates as needed. Agency directives are updated per the schedule or as needed. OSMA audits and assessments also include trending and evaluation of requirements adequacy. Audit results also serve to initiate out of cycle review/update.	OSMA was audited on this process by the Office of Internal Controls and Management Systems in January 2009; no findings were reported. The process has continued to run smoothly.	OSMA's HOWI 1410-GD02 is comprehensive and is used extensively. It provides for full Agency discipline review of draft requirements documents prior to entering signature reviews. Results of discipline reviews are accessible to all reviewers to ensure transparency in requirements development.

<p>Verify the effectiveness of SMA requirements, activities, and processes (NPR 1000.3, para. 4.6.2.1.h, NPD 8700.1, para. 1.f)</p>	<p>NPR 8705.6 and NPR 8715.3 provide requirements associated with audits. The NASA Safety Center web site has a variety of information concerning audits.</p>	<p>Institutional/Facility/Operational Safety Audits, Quality Audits, Assessments, and Reviews, and Requirements Flow-down and SMA Engineering Design Audits and Assessments are performed at NASA Centers and for programs. Center leadership and OSMA executives review audit team findings and recommendations. Note: Quality Audits, Assessments, and Reviews and Requirements Flow-down and SMA Engineering Design Audits and Assessments replaced Institutional Programmatic Support audits and Programmatic Audits and Reviews in 2010.</p>	<p>Review of feedback obtained by those audited. Review of progress of corrective actions. The Institutional/Facility/Operational Safety Audit process was audited by the Office of Internal Controls and Management Systems; no findings were reported.</p>	<p>Institutional/Facility/Operational, Quality Audit, Assessment, and Review, and Requirements Flow-down and SMA Engineering Design Audits and Assessments audits have been conducted and audit findings documented. NASA Centers and NASA Programs have been submitting corrective action plans.</p>
<p>Incorporate and fulfill SMA requirements established for NASA programs and institutions through the structured application of SMA technical authority (NPD 1000.3, para. 4.6.2.1.g, NPD 8700.1, para. 1.j, NM8715-79).</p>	<p>Requirements for Technical Authority are provided in NPD 1000.3 and NPD 8700.1.</p>	<p>The process for implementing technical authority decisions on requests for requirements relief is nearing implementation. Once established these processes will establish specific data to be provided by all programs/projects and institutions to allow OSMA to monitor effective implementation of the technical authority concept. The NASA Safety Center Audits and Assessments Office evaluates SMA Technical Authority implementation at each Center.</p>	<p>Review of completed deviation and waiver requests approved (or disapproved) by the delegated technical authorities. NASA Safety Center Audits and Assessments Office reviews of SMA Technical Authority implementation. Backlog of outstanding comments/issues is managed effectively.</p>	<p>The complete set of processes for SMA Technical Authority are in the final stages of development/implementation; interim processes are in place and being executed. We estimate full implementation by the end of the calendar year 2010. The NASA Safety Center is performing audits of SMA Technical Authority in accordance with the current set of requirements to determine Center implementation of SMA Technical Authority and its implementation on NASA programs and projects managed by each Center. Any issues related to meeting the current requirements for SMA Technical Authority are documented as audit findings and are reported to the Chief, OSMA.</p>

<b>Work Activity (Key Control) 3: Establish and maintain independent lines of communications for unrestricted flow of information concerning SMA, risks, or other matters affecting the ability to meet the mission-success criteria. Fully address safety and mission success concerns, risks, and risk acceptance and appropriate lessons learned at management committee reviews, other major milestone review activities, and operational readiness reviews (NPD 8700.1, para. 1.b, para. 1.h.).</b>				
<b>Work Activity: SMA Communications.</b>				
<b>Major Risk: Death, injury, significant damage to systems or property, or loss of mission.</b>				
<b>Initial Rating: High</b>				
<b>Risk Assessment : If safety information is not freely provided, decision makers do not have the information needed to make decisions. Lack of information can result in mishap.</b>				
<b>Control Activity</b>	<b>Information and Communications</b>	<b>Monitoring</b>	<b>Control Assessment Method</b>	<b>Assessment Results</b>
Provide knowledge management (KM) systems to store and retrieve important documents, lessons learned and video nuggets that are available to the SMA community and serve as the SMA corporate memory. Provide data trending and analysis. Establish effective means of disseminating information. Provide the Enhanced Security Workgroups collaborative environment for the SMA community for interactive communication and SBU data storage (NPD 1000.3, para. 5.13.2.5).	Timely information is provided to the relevant SMA and/or Agency communities.	The NASA Safety Center conducts monthly technical reviews. The NASA Safety Center website hosts a variety of lessons learned, Mishap Warning-Action-Response notifications are issued when a potential safety hazard emerges. OSMA benchmarks NASA's performance with other Federal/Private sector peers.	Results of NASA Safety Center monthly technical reviews. Review of NASA Safety Center web site. Review of Mishap Warning-Action-Response notifications. Review of benchmarking results. Annual IT security reviews.	KM planned activities are on track. The NASA Safety Center website has been reviewed regularly to assure content is current. Mishap Warning-Action-Response notifications have been posted to the NASA Safety Center website. The NASA Safety Center has benchmarked NASA safety rates. IT Security Plans are current.
Ensure that each Center has designated an SMA functional manager (NPD 8700.1, para. 5.e.(1)(c).	Requirement is established within NASA Directives which are available to the NASA workforce.	Agency SMA Directors meetings are convened periodically.	List of SMA Directors. Documentation of SMA Directors meetings on the OSMA web site. Information contained within the Annual Operating Agreement from each Center.	All Centers have a designated SMA functional manager and have exercised appropriate actions for succession as designees change positions.
Provide SMA and risk management expectations and evaluations at Program Management Committee activities and other major program milestone reviews. (NPD 8700.1, para. 5.c.(1)(a)).	Information is posted in minutes from meetings. Safety and Mission Success Reviews (SMSR) are held in advance of program flight readiness reviews.	Program acknowledgement of SMA and risk management expectations. Requirement for Safety and Mission Success Review documented in NPR 8705.6.	Review of meeting minutes.	Safety and Mission Success Reviews were successfully completed for all programs/projects that were subject to a Flight Readiness Review or equivalent. Actions are logged and tracked to closure. SMA leads at the associated Flight Readiness Review or equivalent were well prepared for the meetings and any decisions that needed to be made.

Ensure open communications throughout OSMA.	Divisions and workgroups hold regular staff meetings; OSMA conducts a weekly tag up; OSMA leadership meets weekly.	Meetings are attended by the majority of OSMA staff.	Feedback from meeting participants.	OSMA Division Directors, NASA Safety Center Director, and Independent Verification and Validation Facility Director have scheduled regular staff meetings and participate in OSMA weekly tag-ups. NASA Safety Center hosts monthly Agency SMA/NASA Engineering and Safety Center Working Group telecons. Schedule constraints occasionally result in the cancellation of regular meetings. E-mail is used to provide information/announcements to all staff.
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<b>Work Activity (Key Control) 4: Certify the safety and operational readiness of flight hardware/software, mission-critical support equipment, hazardous facilities/operations, and high-energy, ground based systems through formal review processes (NPD 8700.1, para. 1.g).</b>				
<b>Work Activity: Program readiness process.</b>				
<b>Major Risk: Death, injury, significant damage to systems or property, or loss of mission.</b>				
<b>Initial Rating: High</b>				
<b>Risk Assessment: SMA reviews provide a necessary check and balance to ensure that programs have taken into account safety and mission success considerations prior to flight. The wrong decision can lead to mishap.</b>				
<b>Control Activity</b>	<b>Information and Communications</b>	<b>Monitoring</b>	<b>Control Assessment Method</b>	<b>Assessment Results</b>
Establish review processes to support the certification of hardware and software safety and operational readiness (including flight systems, support equipment, facilities/operations, and ground-based systems) (NPD 8700.1, para. 5.c.(1)(b)).	Various documents (particularly in the 8000 series of directives and standards) describe the requirements and related guidance for the definition of requirements to be placed on programs and projects. In addition, training material to support the implementation of these documents is available.	SMA and Engineering participation and feedback regarding the Safety and Mission Success review process.	Review of Safety and Mission Success Reviews conducted.	Safety and Mission Success Reviews were successfully completed for all programs/projects that were subject to a Flight Readiness Review or equivalent. SMA leads at the associated Flight Readiness Review or equivalent were well prepared for the meetings and any decisions that needed to be made. Safety and Mission Success Reviews are well managed and excellent records are maintained.
Participate in selected certification reviews established by the Mission Directorate Associate Administrators (NPD 8700.1, para. 5.c.(1)(c)).	Minutes from meetings provide information concerning participation and decisions made.	Acknowledgement of SMA input, SMA signature on certification documents.	Review of Mission Support certification reviews.	With a few exceptions for organizational staff limitations, participation is almost 100%.

<b>Work Activity (Key Control) 5. Report and track to resolution all corrective actions resulting from investigations of mishaps, incidents, nonconformances, and anomalies, and distribute and use lessons learned to improve activities and operations (NPD 1000.3, para. 4.6.2.1.1, NPD 8700.1, para. 1.k).</b>				
<b>Work Activity: Mishap investigation/lessons learned.</b>				
<b>Major Risk: Death, injury, significant damage to systems or property, or loss of mission.</b>				
<b>Initial Rating: High</b>				
<b>Risk Assessment: Without learning from previous mishaps, NASA programs may repeat mistakes, resulting in mishap or wasted resources.</b>				
<b>Control Activity</b>	<b>Information and Communications</b>	<b>Monitoring</b>	<b>Control Assessment Method</b>	<b>Assessment Results</b>
Provide trained Mishap Investigation (MI) Specialists to facilitate the mishap investigation process (NPR 8621.1, para. 2.6).	MI Specialists serve as ex-officios and consultants to MI Boards (track progress of boards and recommend solutions for completion).	MI Specialists provide weekly status on open mishap cases.	MI Specialists are trained and facilitating mishap investigation boards.	Mishap training is available through SATERN and instructor-led classes and is very well attended. There are excellent records. MI Specialists have been trained, equipped and deployed to facilitate mishap investigation boards. Weekly status on open mishap cases has been provided and is monitored by the NASA Safety Center. Mishap Investigation Board activity is also shown to senior NASA managers at the monthly Baseline Performance Review. This has proven effective in that Center Directors and various mishap board appointing officials are kept current on mishap status and when various milestone activities are occurring, e.g., mishap outbriefs.

<p>Direct and oversee (in coordination with the appropriate Mission Directorate Associate Administrators) the prompt and accurate reporting, investigating, and analyzing of all NASA mishaps, close calls, including closure of problems, nonconformances, and anomalies, and assure the collection, retention, and communication of their lessons learned as one means of recurrence control (NPD 1000.3, para. 4.6.2.1.1, NPD 1000.3, para. 5.13.2.4), NPD 8700.1, para. 1.k)</p>	<p>Various requirements and guidance documents have been developed and released across NASA (particularly in the 8000 series of directives and standards). OSMA holds periodic meetings with the Center SMA Functional Managers to discuss activities. OSMA sponsors training to compliment requirements and guidance contained within directives and standards.</p>	<p>Mishap reporting at Baseline Performance Reviews, completion of mishap investigations and dissemination of lessons learned through the issuance of Mishap Warning-Action-Response notifications, and the posting of publically releasable mishap reports on NASA websites.</p>	<p>Mishap Investigation Support Office monthly Baseline Performance Review input. Posting of publically releasable reports. Review of mishap reports completed, review of NASA Safety Center communications material regarding lessons learned, review of Aerospace Safety Advisory Council recommendations.</p>	<p>Administration of the mishap investigation process is well defined in NPR 8621.1. Capture of corrective action plans and tracking and monitoring efforts have been reported at Baseline Performance Reviews. Publically releasable reports are posted to Mishap Investigation website. Process analysis and improvement recommendations for existing procedures are being performed. Although mishaps reports are publically released, the time from when the mishap investigation is concluded until the report is available does not meet the requirement as stated in the NPR (145 days). The NASA Safety Center conducted a review of the mishap process and recommendations for improvement were provided to OSMA management. Since that time, some 70 of 82 mishap reports from 2004 through 2010 have been reviewed and endorsed, and are in the process of being evaluated for public release. The secure NASA Mishap Investigation web site now contains over two dozen NASA-endorsed mishap reports, which are available to NASA personnel. In addition, of the 87 mishap reports prepared from 2004 through 2010, 81 are located within the IRIS database and are accessible to NASA personnel. This also includes corrective actions, which are also tracked and reported as needed.</p>
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<b>Work Activity (Key Control) 6. Provide assurance that NASA mission-critical software will operate dependably and safely (NPD 1000.3, para. 5.14).</b>				
<b>Work Activity: Provide independent validation and verification of critical software.</b>				
<b>Major Risk: Death, injury, significant damage to systems or property, or loss of mission.</b>				
<b>Initial Rating: High</b>				
<b>Risk Assessment: Without independently verifying software, there could be errors ultimately resulting in death, injury, significant damage to systems or property, or loss of mission.</b>				
<b>Control Activity</b>	<b>Information and Communications</b>	<b>Monitoring</b>	<b>Control Assessment Method</b>	<b>Assessment Results</b>
Follow well documented and supported processes in the Independent Verification and Validation Management System (IMS), which is ISO 9000 certified, to ensure that software deemed mission critical is checked to avoid any anomalies for the project (NPD 1000.3, para. 5.14).	Information is communicated through multiple means to the project, customers, Centers, Mission Directorates, OSMA, and the Independent Verification and Validation Board of Advisors (IBA).	All documents are visited multiple times throughout the year to ensure they are current, applicable, and compliant.	Multiple required and additional internal and external audits throughout the year to ensure documented processes are being correctly followed.	4 audits (2 internal, 2 external) are conducted a year. The results of our audit shows no systematic problems and the processes are working well. We did capture and implement process enhancements and improvements.
Use the Portfolio Based Risk Assessment (PBRA). This process determines the critical software components and behaviors (NPD 1000.3, para. 5.14).	The results of the PBRA are communicated to the project, the various Mission Directorates, and OSMA.	This process is used twice a year and the documentation is reviewed at a minimum of once a year to ensure applicability and compliance.	This process is well documented and supported in the IMS. The process and documents are included in the ISO 9000 audits that are conducted.	4 audits (2 internal, 2 external) are conducted a year. The results of our audit show no systematic problems and the processes are working well. We did capture and implement process enhancements and improvements. The results/outputs from the PBRA process are vetted to the projects, Mission Directorates, OSMA, and the IBA twice a year. No major comments have been received and customers support this process.
Determine and mitigate risks associated with the project, Independent Verification and Validation functional areas, and the program, through risk review boards (NPD 1000.3, para. 5.14).	Internal risks are communicated to Independent Verification and Validation Facility Management and the functional areas. External risks are communicated to the project and at milestone reviews. Internal risks can be communicated to upper management or outside organizations at the Director's discretion.	This process is constantly used to mitigate old risks and evaluate new risks if needed. The document is reviewed a minimum of once a year.	This process is well documented and supported in the IMS. The process and documents are included in the ISO 9000 audits that are conducted.	4 audits (2 internal, 2 external) are conducted a year. The results of our audits show no systematic problems and the processes are working well. We did capture and implement process enhancements and improvements.

<p>Manage Information Technology (IT) infrastructure utilizing Enterprise Architecture to ensure that line of business are managed and mapped to underlying IT infrastructure. This process is being captured as part of the IMS (NPD 1000.3, para. 5.14).</p>	<p>Information about the current state of IT systems at Independent Verification and Validation Facility is maintained in the Independent Verification and Validation Facility System Security Plan and configuration management systems. Information about the IT infrastructure is disseminated through e-mail and staff briefings. All projects are asked to hold an IT requirements meeting to ensure that all project needs are met with IT provided capabilities.</p>	<p>The Independent Verification and Validation Facility configuration management systems are updated continuously.</p>	<p>IT requirements meetings are conducted at the beginning of each fiscal year and as needed for individual projects. This process and associated documents will be included in the ISO audits that are conducted.</p>	<p>The initial requirements meeting for this fiscal year was held in September, and we have held 169 individualized meetings for ongoing projects and business units to ensure maximum effectiveness.</p>
<p>Manage and ensure a well trained Contracting Officer Technical Representative (CoTR) workforce to support the Independent Verification and Validation Facility procurement activities (NPD 1000.3, para. 5.14).</p>	<p>Information is communicated through multiple internal management and external (GSFC Procurement, GSFC Management, OSMA, etc.) channels.</p>	<p>Independent Verification and Validation Facility CoTRs are monitored by the GSFC contracting officer assigned to the Independent Verification and Validation Facility.</p>	<p>Independent Verification and Validation Facility CoTRs are required to take the mandatory CoTR training, and do so through the GSFC. GSFC Contracting Officer provides COTR delegation of duties and monitors per the Federal Acquisition Regulation (FAR) and NASA FAR.</p>	<p>Independent Verification and Validation Facility CoTRs have taken the required training. In addition, training status of CoTRs is verified during regular Independent Verification and Validation Facility business process audits discussed above.</p>

## **Appendix A: Roles and Responsibilities for Headquarters Program Executives and Delegated Program Managers**

### A.1 Role of the Program Executive:

A.1.1 Program Executives are Headquarters officials that represent OSMA in all aspects of the management and oversight of their designated projects. These positions are primarily focused on Agency policy, oversight, and advocacy.

A.1.2 Specific responsibilities of the Headquarters Program Executives include:

- a. Establishing and documenting program objectives, requirements, and metrics.
- b. Assuring that all Agency and government policies are appropriately implemented.
- c. Providing liaison with other Headquarters offices, NASA Centers, and international committees as appropriate.
- d. Reviewing and approving the integrated budget proposals provided by the Delegated Program Managers.
- e. Assuring that actions assigned to the project, including any Inspector General, Government Accountability Office, or advisory review panels are appropriately handled.
- f. Reviewing and approving official project-level documentation.
- g. Developing plans for Independent Assessments as needed.
- h. Developing Letter of Agreement and Memorandum of Understanding for external partners as needed.
- i. Monitoring Center budgets, staffing, schedules, and technical performance.
- j. Attending and reporting on Center-level project status reviews.

### A.2 Role of Delegated Project Managers:

A.2.1 Delegated Project Managers are usually senior Center personnel who are responsible for the implementation of the policy and guidelines received from Headquarters. They integrate all Center inputs and make a project level execution plan. They are responsible for the management of project cost, schedule, and technical performance. These positions are primarily focused on project and contractor management.

A.2.2 Specific responsibilities of the Delegated Project Managers include:

- a. Overseeing the Project Plan execution.
- b. Meeting technical requirements on time and within costs.
- c. Developing and obtaining appropriate approvals for project-level documentation for project implementation (e.g., project plan, work breakdown structure, detailed budgets and schedules, contractor management, etc.).
- d. Managing the project's contract requirements.
- e. Managing project risks and determining risk mitigation strategies.
- f. Controlling project changes.
- g. Formulating multi-year, multi-Center integrated budget requests.
- h. Overseeing and approving any changes to the project budget in the execution year.
- i. Reporting project performance metrics.
- j. Reporting project performance to Center management and Headquarters management in a timely way.