



Mission Success Starts With Safety

-- Frederick D. Gregory, Associate Administrator for Safety and Mission Assurance



NASA's agenda for the next few years is one of unprecedented activity. We've increased the Space Shuttle flight rate. We're continuing the assembly of the International Space Station (ISS) and, in the fall of this year, we'll establish a full time human

presence on the ISS. We're launching new space science and earth science missions on expendable launch vehicles to explore the solar system and understand the Earth system. We are conducting important life and microgravity research that will result in medical breakthroughs to help people on Earth. We're working to increase safety and decrease the cost of space travel on the next generation of reusable launch vehicles. We're working to make air travel safer for travelers and safer for the environment while decreasing the cost of flying. These are exciting times to be working for NASA.

NASA's programs are ambitious and the schedules are aggressive. The contributions of the SMA community will be critical. The slower flight rate of the past couple of years provided the opportunity for the SMA community to do some thinking, planning, and organizing to strengthen the approaches and tools for safety and mission success. It's time to apply the results of our intellectual work to get the best quality.

The SMA community must help NASA missions keep safety in the forefront, before schedule and before cost. As the Agency's safety conscience, we must provide assistance, assurance, and oversight so that NASA activities do not cause loss of life, personal injury or illness, property loss or damage, or environmental harm. We must also help the Center Directors ensure safe and healthful conditions for persons working at or visiting NASA facilities. We need to remember that we are responsible for calling attention to an activity and stopping it if it is unsafe.

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Risk Management

--Allan Keith Layne, MSFC

Today's environment provides NASA with a myriad of financial, technical, and programmatic challenges. The Agency is incorporating performance-based and fixed-price contracts with industry and employing more partnerships with the international community. There is less money for development and little money to recover from contingencies or mishaps.

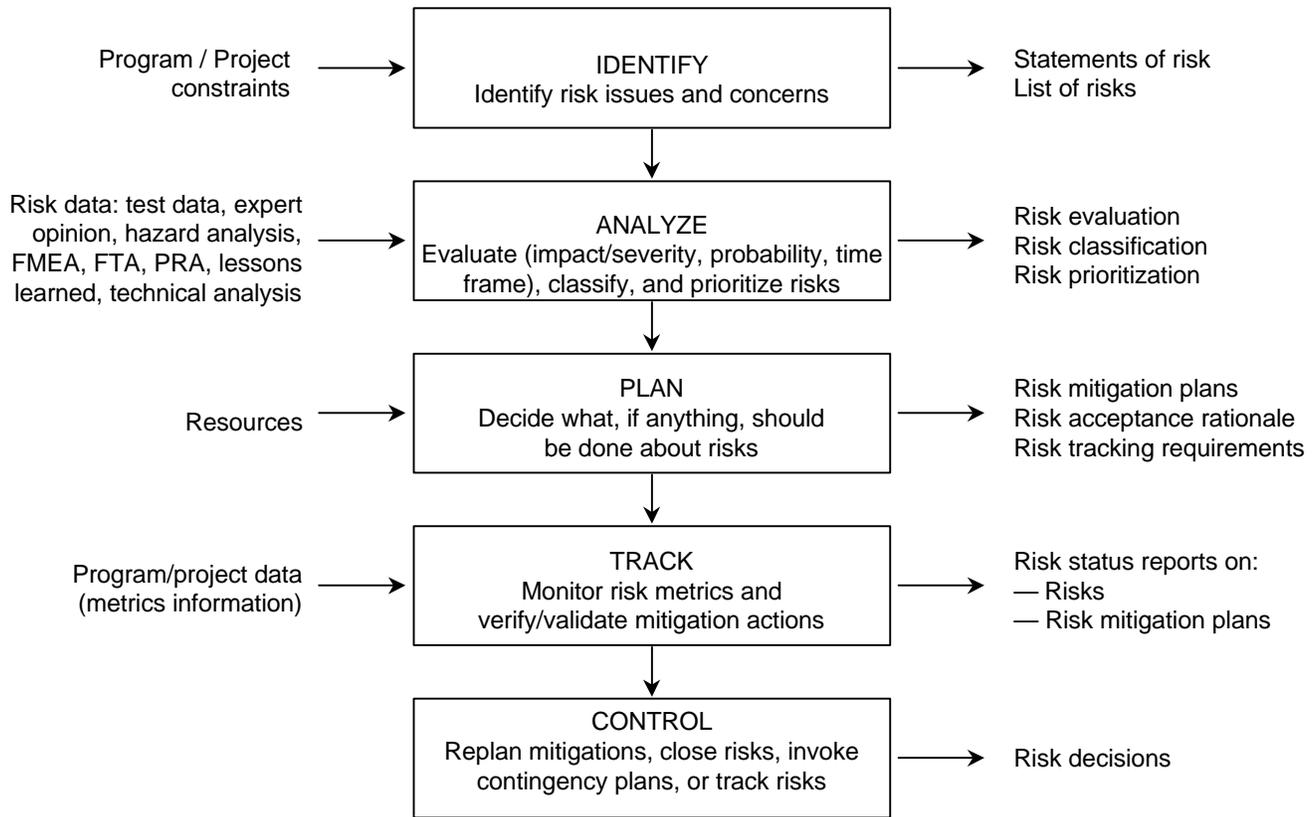
Although NASA has always performed risk management, effective risk management is now, more than ever, essential to assure mission success. In fact, NPG 7120.5A, "NASA Program and Project Management Processes and Requirements," requires the performance of risk management on all NASA programs/projects.

Risk management is an organized, systematic decisionmaking process that efficiently identifies, analyzes, plans, tracks, controls, communicates, and documents risk to increase the likelihood of achieving program/project goals. It is an engineering technique that incorporates processes, methods, and tools for managing risks within a program/project. The figure on page two describes the risk management process.

What Risk Management Does:

Risk management enables NASA to optimize programs and projects in the face of uncertainty. By applying formal risk management early in the formulation stage and throughout the program/project, managers can assess continuously what could go wrong (risks), determine which risks are important to address, and implement strategies to handle those risks. When risk management is properly implemented, the program/project manager will have a prioritized risk list at any point during the program/project life cycle that includes programmatic impacts. The program/project manager will also have a good idea of what the risk signature (expected risks and when risks are expected to increase or decrease) of the program/project will be. This data enables the program/project manager to make informed decisions concerning cost, schedule, and technical performance.

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Risk Management Process Flow Diagram

Risk Management Benefits:

The benefits of risk management are:

- 1) Risk management prevents problems before they occur. It identifies potential problems and addresses them when it is easier and cheaper to do so, before they become problems and a crisis exists.
- 2) Risk management improves product quality. It focuses on the project's objective and consciously looks for things that may affect quality throughout product development.
- 3) Risk management enables better use of resources. It allows for the early indication of potential problems and provides input into management decisions regarding resource allocation.
- 4) Risk management requires managers and engineers to incorporate risk considerations in their practices and decisionmaking process, throughout the program/project life cycle.
- 5) Risk management promotes teamwork. It involves personnel at all levels of the project, focuses their attention on a shared product vision, and provides a mechanism for achieving it.

To learn more about this topic, see:

Continuous Risk Management Website:

<http://satc.gsfc.nasa.gov/crm/>

NASA Site for On-line Learning and Resources (SOLAR):

<http://solar.msfc.nasa.gov:8018/solar/delivery/public/html/newindex.htm>

"Continuous Risk Management Guidebook," published by Software Engineering Institute at Carnegie Mellon University.

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Glenn Hosts 3rd Annual Assurance Technology Conference

The 3rd NASA Assurance Technology Conference was held at Glenn Research Center on June 7th and 8th. The annual conference provides a venue for the exchange of ideas, experiences, successes, and challenges for NASA safety, reliability, risk management, and quality assurance professionals. The conference was co-chaired by GRC SMA Director Bill Wessel and Tom Gindorf of JPL.

This year's theme, "*Risk Management - Success Management*," underscored NASA's recent emphasis on risk management. The 19 presentations included recent Risk Assessment and Management tool developments and their applications, Thermal Protection Systems and Analysis, Range Safety, Radiation Susceptibility, Space Mechanisms Assurance, Long-Term Satellite Reliability, management and technical initiatives designed to maintain control over software development, and Failure Detection and Prevention tools. The presentations may be found at:

<http://www-osat.lerc.nasa.gov/ATC/>



School Bus Safety Tips

Making your child aware of the following safety tips can help prevent injury:

- Be on time. Don't run to or from the bus.
- Line up facing the bus door, not along the side of the bus.
- Never reach under the school bus to retrieve anything.
- Stay in your seat. Don't yell or shout. Don't throw things.
- Obey the bus driver.
- Wait for a signal from the bus driver before you cross the street. Walk at least ten steps from the front of the bus so that the bus driver can see you.
- Never cross the street behind the school bus.

Risk Balancing Profiles

The Failure Detection and Prevention Program, a joint JPL/GSFC/GRC program funded by OSMA, is developing various products to help SMA and program/project personnel identify and manage risk. One product is a series of Risk Balancing Profiles (RBP) covering several mission assurance disciplines. The RBP's are designed as 'smart' checklists for use early in the project formulation phase. The RBP's help project managers and SMA leads define the appropriate scope and content of the project's mission assurance program.

The RBP approach is based on the idea that specific mission assurance activities can be correlated to the risks they mitigate. On paper these RBP's are generally arranged in two columns, the first representing a very low or minimum risk program for which there is a large list of required mitigation activities that achieve a correspondingly small level of residual risk. Of course, this assumes the resources (funding, schedule, staffing) are available to embark on such a minimum risk program. At the other end of the spectrum is the very high-risk program (not recommended for most projects) that has, by definition and/or design, minimal mission assurance program content resulting in much greater residual risk but with a large range of options available for mitigating these risks.

An RBP software tool has been developed and is available for NASA use. The tool allows users to more easily interpret risk information and the linkages to mitigating actions. The tool cross-references program risks to specific mitigating mission assurance activities. As the mission assurance program content is selected and tailored, unaddressed risks are easily seen. This cross-referencing also facilitates consideration of additional mission assurance activities that would further reduce risk.

The tool is intended for use in the project planning and formulation phase to identify which mission assurance activities will be performed and what program risks remain. Use of this tool will help establish the rationale for performing certain mitigation activities and will enable SMA personnel to discuss specific risk and risk mitigation options knowledgeably with project management early in the program/project development lifecycle. The goal is to provide the necessary

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NASA Partners with the Air Force to Attract Minority Students to Aerospace

--Sonja Alexander, Code PM

For the first time NASA used an established U.S. Air Force agreement to fund flight training for minority Air Force Reserve Officer Training Corps (ROTC) candidates. OSMA co-funded two three-week flight training programs for 18 Air Force cadets who are engineering, mathematics, and science majors.

NASA is actively seeking minority astronaut pilot candidates, and is tapping into the success of the Air Force program. Upon successful completion of the training, the cadets receive their solo wings, meaning they have met the Federal Aviation Administration's

solo requirements for flying a single-engine aircraft.

In 1996, the Air Force developed this flight training to introduce Air Force ROTC cadets to the rudiments of aviation. The program was designed to help the Air Force increase the number of cadets from Historically Black Colleges/Universities and Minority Serving Institutions entering aerospace operations.

The contractor for this effort is the Delaware State University (DSU), Dover. DSU has eight planes for training purposes, making it the only Historically Black College in the country with its own fleet.



Associate Administrator Fred Gregory with students and instructors at Delaware State University

NASA Directives and Standards on the Web

Several SMA directives and standards are now available on the Web. You may find them at

<http://nodis.hq.nasa.gov/Library/processes.html> or
<http://www.hq.nasa.gov/office/codeq/doctree/doctree.htm>

New Directives:

- NPG 8621.1, NASA Procedures and Guidelines for Mishap Reporting, Investigating, and Recordkeeping, June 2, 2000
- NPG 8735.2, Management of Government Safety and Mission Assurance Surveillance Functions for NASA Contracts, August 15, 2000

New Standards:

- NASA-STD-8719.11, Safety Standard for Fire

Protection, August 29, 2000

Standards newly available on the web:

- NSS 1740.16, Safety Standard for Hydrogen and Hydrogen Systems, February 12, 1997
- NASA-STD-8739.1, Workmanship Standard for Staking and Conformal Coating of Printed Wiring Boards and Electronic Assemblies, August 6, 1999
- NASA-STD-8739.2, NASA Workmanship Standard for Surface mount Technology, August 13, 1999

Susan Kilrain Assigned to OSMA



Lieutenant Commander Susan Kilrain (USN) will serve as Manager, Aviation Safety, during her detail to OSMA. She earned a Master of Science degree in aerospace engineering from Georgia Institute of Technology. She was commissioned in the

Navy in 1985, and designated as a naval aviator in 1987. Commander Kilrain has logged over 3000 flight hours in more than 30 different aircraft including the TA-4J Skyhawk, the EA-6A Electric Intruder, and the F-14 Tomcat.

Commander Kilrain reported to Johnson Space Center in 1995. After a year of training, she worked technical issues for the Vehicle Systems and Operations Branch of the Astronaut Office. Cmdr. Kilrain flew as a pilot on STS-83 and STS-94, and has logged over 471 hours in space. She also served as spacecraft communicator (CAPCOM) in mission control during launch and entry.

"Mission Success", from p. 1

NASA missions must also achieve results. We want the American taxpayers to get their money's worth. SMA plays an important role in mission success. We need to help the programs incorporate safety and mission success requirements and practices from the very start. We need to provide guidance in risk assessment and management. We need to continue to perform reviews, independent assessments, process verifications, and other checks and balances necessary to assure mission success. We need to stay alert. If we don't think a program is going to work, we need to speak up.

NASA's goals and objectives are ambitious, and it's going to take a lot of effort from a lot of people for us to succeed. I know the SMA community can be relied upon to do its part. Let's make sure, when we turn off the lights at the end of the day, that we've done everything we could to support safe and successful missions and operations.

NASA's PRA Capability in the New Millennium

Dr. Michael Stamatelatos

NASA has embarked on an ambitious effort to coordinate, integrate, and enhance its probabilistic risk assessment capabilities and practices. We are hiring PRA experts, obtaining PRA technology from other Government agencies, developing PRA policy and procedures for aerospace applications, training practitioners and managers on the methodology and value of PRA, adopting state-of-the-art PRA software, and developing advanced PRA computational methods.

This effort requires coordination and integration of our efforts and skills throughout the Agency. The Administrator's strong encouragement has been a great initial motivator but it will be the joint efforts of NASA managers and technical experts that will make it a reality.

In order to bring together project managers and key technical personnel with an interest in PRA, we are planning a two-day workshop on PRA at an off-site location in the Washington area at the end of October. An announcement will be issued separately. This workshop will serve as an initial coordination meeting of the PRA community at NASA.

NASA PRA Practices and Needs for the New Millennium

Washington DC Area, October 25-26, 2000

Organizer:

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information for a project to make timely and informed tradeoffs between the available resources and acceptable and understood risks.

Covered mission assurance discipline areas are: Environmental Testing, Electronic Parts Program, Electronic Parts Testing/Screening, Software Quality Assurance, Environmental Requirements, Risk Management, Reliability Assurance, Radiation Hardness Assurance, Hardware Quality Assurance, and Project Reviews. Additional disciplines are being developed.

For additional information, contact Steve Wander on (202) 358-4612 or at swander@hq.nasa.gov

New Director Named for HEDS Independent Assessment



Henry L. Davis has been named Director of OSMA's Human Exploration and Development of Space (HEDS) Independent Assessment (IA). As Director, HEDS IA, Mr. Davis will lead timely, objective, non-advocacy assessments of Space Shuttle and International Space Station

program health and status in key areas of design, engineering processes, manufacturing, assembly, and operational mission capabilities. Mr. Davis joined NASA in 1994. He served as Technical Assistant to the Director, Space Station Program, before becoming the Director, Technology Transfer and Commercialization Office, at the Johnson Space Center.

Food Container Safety Tip

Always wash the tops of food containers before opening them. You never know what was on the containers- dirt,



chemicals, dust, rodents- during storage (at the warehouse or in your cupboard) or transport. The May 2000 issue of Alternative Medicine cited a food store clerk who died of hantavirus that was traced to rodent droppings in a warehouse area. The magazine also notes that some stores spray their

storage areas- and products- with pesticides.

Boy Scouts Recognize HQ Employee for Service to Youth

John W. Lyver, IV, of Office of Safety and Mission Assurance, was awarded Boy Scouting's Silver Beaver Award on June 6, 2000. The Boy Scouts of America annually recognize a select few volunteers for their dedication and service to youth. Established in 1931, the Silver Beaver Award is the highest local award for distinguished volunteer service and is presented to less than one in a thousand leaders. The local BSA Council, National Capital Area Council, covers more than 30,000 Boy Scouts in Northern Virginia, Maryland, and the District of Columbia.

PRA Workshops Continue

Workshops to learn to use SAPHIRE, NASA's baseline probabilistic risk assessment software tool, are scheduled for September 19-22 at GSFC and November 28-December 1 at JSC. MSFC will host a workshop this winter. For information on the SAPHIRE workshops, contact Dr. Michael Stamatelatos at 202-358-1668, or by e-mail at mstamate@hq.nasa.gov.

The Department of Energy's Idaho National Engineering and Environmental Laboratory (INEEL) developed SAPHIRE for the Nuclear Regulatory Commission. Currently in version 7.0, SAPHIRE is an internationally recognized tool for conducting PRA and is free to government users. OSMA-sponsored workshops at Headquarters, ARC, and JSC have introduced about 30 people to SAPHIRE over the past few months.

Useful URLs

OSMA Home Page

<http://www.hq.nasa.gov/office/codeq> includes a wide variety of SMA information and links.

Site for On-Line Learning and Resources Over 70 Web-based SMA training courses, as well as courses in Occupational Health, Procurement, Financial & Resources Management, IT Security, and Ethics. See <http://solar.msfc.nasa.gov>

Lessons Learned Information System Knowledge that NASA has learned the hard way is at: <http://llis.nasa.gov> Make certain to enable Java on your browser.

NASA SMA Requirements

Hit the "Policy/Req" button on OSMA's home page, or go directly to:

<http://www.hq.nasa.gov/office/codeq/doctree/doctree.htm>

OSMA Newsletter

<http://www.hq.nasa.gov/qnews> has current and back issues. E-mail comments to: qnews@hq.nasa.gov

NASA Safety Reporting System

Confidential reporting of unresolved safety problems. See <http://www.hq.nasa.gov/nsrs> or contact the NSRS Project Manager at (703) 237-8083.