



Space Shuttle
Lessons Learned

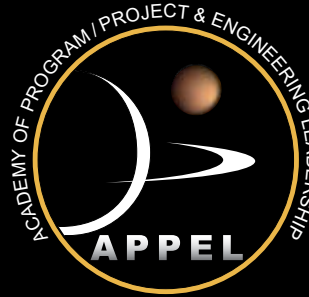
Knowledge Sharing Forum



Presented January 27, 2011, by
**The NASA Academy of Program/
Project and Engineering Leadership**
in collaboration with the **NASA Centers
Lessons Learned Steering Committee**



*The NASA Academy of Program/Project and Engineering Leadership's Knowledge Sharing initiative,
in collaboration with the NASA Centers Lessons Learned Steering Committee, presents*




Space Shuttle Lessons Learned Knowledge Sharing Forum

January 27, 2011

Kennedy Learning Institute | Kennedy Space Center, FL
<http://llis.nasa.gov> | <http://appel.nasa.gov>

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Welcome to the **Space Shuttle Lessons Learned Knowledge Sharing Forum pilot**. As NASA prepares for the retirement of the Space Shuttle and the development of its replacement, it is timely to reflect upon the many important lessons learned from key areas of the Space Shuttle program. Today, our colleagues from Kennedy Space Center, Marshall Space Flight Center, and Johnson Space Center will share personal shuttle program stories, insights, and lessons learned. I trust by the end of the day, we all will have learned new ways to share knowledge, which can then be leveraged to improve our current processes and procedures, as well as benefit the development of new systems and future capabilities.

This Forum is a collaboration between the NASA Academy of Program/Project and Engineering Leadership and the NASA Centers Lessons Learned Steering Committee. At today's one-day pilot, you will be introduced to NASA's Lessons Learned Information System process, content, and uses; learn about NASA's case study knowledge-capture process; and review insightful Space Shuttle case studies and lessons learned from Kennedy, Marshall, and Johnson.

Your participation is an important part of the success of today's event. Our vision is to evolve this pilot into a two-day agencywide version of the Space Shuttle Lessons Learned Knowledge Sharing Forum that will include additional case studies and lessons learned, with participation from all NASA centers that supported the shuttle program. Finally, the longer-term goal is to develop an official Academy engineering course with shuttle lessons learned at its core, complemented by a Space Shuttle historical overview, flight statistics, and design considerations and trades that would benefit NASA personnel working on future space transportation systems.

By capturing and sharing knowledge across the agency, we are establishing a community of reflective practitioners, whereby we will all be better equipped to leverage knowledge that will enable NASA to create better processes, systems, and vehicles in the future. We hope you find today's Forum enlightening as you hear lessons firsthand from shuttle experts, offer a few stories of your own, and learn new ways to share our unique knowledge as we take on our next NASA challenges.

Sincerely,

Edward Hoffman, Academy Director,

and the SSLL Knowledge Sharing Forum Planning Team





Agenda

Agenda

Kennedy Learning Institute • January 27, 2011

8:00 a.m. Attendee Registration and Meet and Greet

8:30 a.m. Opening

- Welcome
 - *Pat Simpkins, Director, Kennedy Space Center Engineering and Technology Directorate*
- Opening Remarks/Forum Overview/Introductions
 - *Ed Hoffman, Academy Director*
- Charge to Participants
 - *Stephen Angelillo, Kennedy Space Center Managing Director, Academy Training Center, and Forum Facilitator*

8:45 a.m.–10:00 a.m. Introductory Module: Capturing Knowledge

- LLIS Introduction, Overview, and Process
 - *Michael Bell, Lessons Learned Program Manager and Steering Committee Chair*
- Learning from Case Studies
 - *Barbara Fillip, Goddard Space Flight Center Knowledge Sharing Project Manager, Office of the Chief Knowledge Officer*
 - *Matt Kobut, Academy Communications*
- Module Knowledge Capture: Roundtable Discussions, Reflections, and Group Reports (final 10 minutes)

10:00 a.m.–10:15 a.m. Morning Break

10:15 a.m.–Noon Module I: Kennedy Space Center Space Shuttle Lessons Learned

- *Module Lead: Russel Rhodes, Kennedy Space Center*
- *Module Lead: George Veaudry, Engineering Integrator, Kennedy Space Center Planning and Development Office*
- Kennedy Space Center Space Shuttle Lessons Learned Case Histories
- Kennedy Space Center Module Knowledge Capture: Roundtable Discussions, Reflections, and Group Reports (final 10 minutes)

Noon–1:15 p.m. Catered Networking Lunch at the KLI

1:15 p.m.–2:45 p.m. Module II: Marshall Space Flight Center Space Shuttle Lessons Learned

Module Leads:

- *Module Lead: Jody Singer, Deputy, Shuttle Propulsion Office*
- *Module Lead: Carolyn Griner, NASA (retired)*
- Marshall Space Flight Center Space Shuttle Lessons Learned Case Histories
- Marshall Space Flight Center Module Knowledge Capture: Roundtable Discussions, Reflections, and Group Reports (final 10 minutes)

2:45 p.m.–3:00 p.m. Afternoon Break

3:00 p.m.–4:30 p.m. Module III: Johnson Space Center Space Shuttle Lessons Learned

Module Lead:

- *Module Lead: Frank Buzgard, NASA (retired)*
- Johnson Space Center Space Shuttle Lessons Learned Case Histories
- Johnson Space Center Module Knowledge Capture: Table Discussions, Reflections, and Group Reports (final 10 minutes)

4:30 p.m.–5:15 p.m. Knowledge Capture Session and Group Reports/Briefings

- *Stephen Angelillo/Participants*

5:15 p.m.–5:30 p.m. Conclusion

- Summary/Q&A/Wrap-Up Comments
 - *Stephen Angelillo/Participants*
- Calls to Action/Conclude Forum
 - *Stephen Angelillo/Ed Hoffman*
- Course Evaluation Survey
 - *Participants*

About the Forum Moderators

Welcome—Pat Simpkins, Director, Kennedy Space Center Engineering and Technology Directorate



Patrick Simpkins is the director of Engineering at Kennedy Space Center. In this position, he leads a group of engineers from multiple disciplines in the design, development, and operations of spaceflight hardware and ground systems assigned to Kennedy. He began his NASA career in 1983 as a shuttle engineer and served in various roles of increasing responsibility in the Space Shuttle program for fifteen years. He pursued an education in human resource management and served as Kennedy's Personnel Officer. After completing the Senior Executive Service Candidate Development Program, he worked in human resources at NASA Headquarters for two years.

Dr. Simpkins has been a recipient of a number of awards and leadership development programs throughout his career. He was selected for the Senior Executive Service Candidate Development Program in 2001, where he received executive-level education from the University of Michigan and as a Harvard senior executive fellow. His developmental assignments included a role as project manager in the Intelligent Synthesis Environment program at Langley Research Center and as a facilitator at NASA Headquarters in the design and development of the NASA Strategic Human Capital Plan enabling NASA to achieve the first "green" rating in human capital on the president's management agenda. Awards have included the Astronauts' Silver Snoopy Award and the Exceptional Achievement Medal.

Dr. Simpkins holds a bachelor's degree in environmental engineering from the University of Florida and a master's in human resource management from the Florida Institute of Technology. He received a doctorate in business administration from Nova Southeastern University.

Opening Remarks/Forum Overview/Introductions—Ed Hoffman, Academy Director



Ed Hoffman serves as the director of the NASA Academy for Program/Project and Engineering Leadership. In this role he is responsible for the development of program/project leaders and engineers within NASA. Under his leadership, the Academy provides the agency's comprehensive career-development curriculum, consulting services for technical and mission teams, knowledge-sharing activities and publications that disseminate lessons learned, and special studies on program/project management and engineering. He works both within NASA and externally with leaders of industry, academia, and other government agencies to build the agency's capabilities in program/project management and engineering.

Dr. Hoffman holds a doctorate as well as Master of Arts and Master of Science degrees from Columbia University in the area of social and organizational psychology. He received a Bachelor of Science in psychology from Brooklyn College in 1981. He serves on the faculty of The George Washington University Project Management Program. He is a founding member of the International Project Management Committee. Dr. Hoffman served as the chair of the Project Management Institute's Global Corporate Council, and he is frequently a keynote presenter at conferences and association events. He has published numerous articles and two books on program and project management, *Project Management Success Stories: Lessons of Project Leaders* (Wiley, 2000) and *Shared Voyage: Learning and Unlearning from Remarkable Projects* (NASA History Division, 2005).

Charge to Participants—Stephen Angelillo, Kennedy Space Center Managing Director, Academy Training Center, and Forum Facilitator



As program manager for the Academy of Program/Project and Engineering Leadership at Kennedy Space Center for the past three years, Stephen Angelillo has played a significant role in increasing Academy awareness at Kennedy and NASA-wide by increasing efficiencies, standardizing the Kennedy Academy nomination process, and working with training and support personnel to enhance the experiences and understanding of materials and course products by participants. Also during this time, he improved the Kennedy onboarding program and developed several employee-based tools for resource management, which have been benchmarked by other federal and state agencies.

Last year, with support and cooperation from Kennedy senior leadership and the director and deputy director of the Academy, Mr. Angelillo proposed a centralized training center for the Academy to be located at Kennedy. This center will act as a springboard to broaden and introduce Academy-supported products to international partners, as well as to highlight Kennedy capabilities and facilities for participants.

Mr. Angelillo was a member of the Kennedy and Florida Institute of Technology team, which submitted a proposal to host the 2012 International Space University Space Studies Program. That application was recently reviewed and accepted, and the institutions will be co-hosting this esteemed program in 2012. He has been recognized for his continuing distinguished level of contributions to the Kennedy HR Development and Recognition Office, the NASA Program/Project Management Development program, and Glenn Research Center's Leadership University, and his ongoing assistance to enhance and provide tools for employees and organizations so they can function in a more efficient work environment. He was recognized for his participation and support of the 2008 and 2009 PM Challenges with the 2009 Distinguished Contribution Award. He also was recognized by Kennedy with a Certificate of Appreciation for his outstanding leadership and innovation.

Mr. Angelillo attended the College of Charleston's business program, holds a green belt in KAIZEN/Lean Six Sigma, and is working toward his project management certification. He brings twenty years of business development, sales, training, and marketing experience to the Academy.



Presentations

Introductory Module: Capturing Knowledge

January 27, 2011



Michael Bell, Kennedy Space Center

The NASA Lessons Learned Information System (LLIS) is the backbone of the NASA Lessons Learned Program. This information system is part of the NASA Engineering Network, and the Office of the Chief Engineer serves as the Office of Primary Responsibility for oversight of the NASA lessons learned process. NPR 7120.6 (Lessons Learned Process) is part of the family of engineering technical requirements that govern NASA's program management functions. The LLIS captures experience from successful tests or missions, mishaps or failures; all are excellent sources of learning.

This system enables self-paced and collaborative learning so researchers, designers, or project managers can search and submit lessons, helping employees across the agency to learn from collective experience.

This briefing will review the following:

- Lesson components
- Submission form
- Review and approval process
- Searching
- Taxonomy and lesson categories
- Repositories
- Interface with NASA technical standards

Barbara Phillip, Goddard Space Flight Center

Matthew Kohut, Academy of Program/Project and Engineering Leadership

The session will include an overview of the case study approach, followed by a discussion of selected Space Shuttle case studies.

A. Case Study Approach Overview

- Benefits of case studies and differences between case studies and lessons learned
- Methodology for developing cases and integration of cases in training sessions and knowledge-sharing workshops
- Existing collections of NASA cases

B. Space Shuttle Case Studies

- “In Pursuit of Images of *Columbia*”
- “Space-to-Space Communications System”
- “The Last Flight of *Columbia*”
- “STS-119 Flow-Control Valve Issue”

The cases have been selected to illustrate specific points about each.



About the Module Leads



Michael Bell is the program manager for the agency's lessons learned program and serves as the center data manager for the Kennedy Space Center. In this position he promotes the collection and sharing of knowledge through the Lessons Learned Information System, which is a tool to improve project performance and promote technical excellence.



Barbara Phillip is a knowledge management specialist in the Office of the Chief Knowledge Officer at Goddard Space Flight Center. She came to Goddard as a contractor with Library Associates Companies in May 2008 after spending more than ten years working in the field of international development, occupying functions encompassing program and project evaluation, information and communication technologies for knowledge sharing, as well as capacity building and training.



Matthew Kohut leads the communications team for the NASA Academy of Program/Project and Engineering Leadership. He serves as the editor of the ASK the Academy e-newsletter and oversees the development of the Academy's case studies. He has twenty years' experience writing about scientific, technical, and quantitative subjects for both general and expert audiences, including engagements with the Department of Energy, the Environmental Protection Agency, Harvard University, and the German Marshall Fund of the United States.

WHAT STEPS MIGHT YOU TAKE TO INCORPORATE THESE LESSONS IN YOUR PROJECTS, OR CAREER?

PLEASE CAPTURE ANY ADDITIONAL THOUGHTS AND REFLECTIONS THAT YOU WOULD LIKE TO SHARE.

NOTES

Module I: Kennedy Space Center Space Shuttle Lessons Learned

January 27, 2011



Module Leads

Russel Rhodes, Kennedy Space Center

George Veaudry, Kennedy Space Center

The knowledge of ground processing and the practices refined during the shuttle program represent a unique experience base. A Ground-Processing Knowledge-Capture Lessons Learned team recently led an effort to capture knowledge at Kennedy Space Center. The team identified 184 potential lessons learned from twelve existing launch-site-support product teams for input into the NASA Lessons Learned Information System.

Many of these lessons learned entries concern the interface between the Space Shuttle system and the ground-processing infrastructure with recommendations, design considerations, and requirements for human-rated launch and recovery operations. This information will have a major impact on future programs across the agency.

Presenters

Albert Curry, Boeing

Shuttle Orbiter Airlock Hatch Failure on STS-80 (Lessons Learned Entry 4417)

Anthony Chambers, Boeing

Thermal Control System Blanket Interference with Bulkhead Vent Ports (Lessons Learned Entry 2716)

Armand Gosselin and Gabor Tanacs, USA

Flame Trench Refractory (Lessons Learned Entry 3236)

Hal Turner, NASA

Selection and Use of Software Metrics for Software Development Projects (Lessons Learned Entry 3556)

Russel Rhodes, NASA

Space Shuttle Propulsion Systems Ground Processing Lessons Learned (Lessons Learned Entry 2977)

About the Module Leads



Russel E. Rhodes is a native of the state of Indiana, where he earned a BS in aeronautical engineering from Indiana Institute of Technology in 1958, and has been a senior member of the American Institute of Aeronautics and Astronautics for more than fifty-five years. He has been employed at NASA for fifty years at Kennedy Space Center. During that time, he has been engaged in the design, development, testing, and operation of ballistic missiles and space transportation systems. He has specialized experience in space vehicle propellant loading, cryogenic, hydraulics, high-pressure gases, and other propulsion systems.

Mr. Rhodes has served as a systems engineer and in engineering management roles with the Pershing, Redstone, Jupiter, Saturn I/IB, Saturn V/Apollo, Skylab, and shuttle programs, and he is presently engaged in the Constellation program. He has served on mishap evaluation teams both on and off center, and as the Kennedy representative to many NASA-sponsored working groups and advisory committees. Presently, Mr. Rhodes is a charter member of the Space Propulsion Synergy Team, a member of the steering committee, focusing on strategic aspects of future advanced space-transportation-system technology development and providing affordable access to space. He has led a functional requirements subteam and developed several study products in support of NASA and others. His publications include several technical papers on advanced space propulsion and space transportation systems, focused on lowering the cost of space transportation systems and providing affordable access to space.



George Veaudry has spent his entire professional career with NASA. After obtaining a Bachelor of Science in aeronautical engineering from the University of Florida, he launched his career in 1976 as an unpaid Kennedy Space Center intern working on the Bicentennial Celebration. Impressed with the quality of his performance and his general work ethic, Mr. Veaudry was offered a position in the Shuttle Engineering Directorate, working on the auxiliary power units (APU) and hydraulics systems. He later served as the lead APU/hydraulics systems engineer at Dryden Flight Research Center for the first experimental shuttle Enterprise OV-101 approach landing tests.

Since that time, he has held numerous technical and management positions within NASA across multiple directorates, including chief of the Fluids and Propulsion Division in the newly formed Kennedy Engineering Directorate. He currently serves as a technical assistant for the Operational Systems Engineering Office responsible for the development of innovative partnerships to utilize engineering resources within the Engineering Directorate. He is also the Space Shuttle Knowledge-Capture Lessons Learned project lead, where he and his team were responsible for capturing more than 190 shuttle lessons learned for the agency's lessons learned database. He has served on multiple source boards, including the Exploration Ground Launch Services Source Evaluation Board as part of the technical team, the Technical Committee chair on the NASA Launch Services Board, and the Payload Ground Operations contract RFP as a member of the Technical Committee. He was also selected to serve on the Magellan Mishap Investigation Board as a member of the processing procedures investigation committee.

Module II: Marshall Space Flight Center Space Shuttle Lessons Learned

January 27, 2011



Module Leads

Jody Singer, Marshall Space Flight Center

Carolyn Griner, Marshall Space Flight Center

Over the past thirty years, Marshall's Shuttle Propulsion Office has played a key role in the safe and successful operation of the venerable Space Shuttle. This presentation will summarize key lessons learned across the shuttle propulsion elements during the vehicle's life cycle. Included in this discussion are lessons learned from the reusable solid rocket motor that led to the evolution of the current motor, as well as the importance of testing and post-flight assessment, adequately addressing minority opinions, and the development of the seven elements of good flight rationale. The presentation will also highlight the history of the Space Shuttle main engine (SSME) along with reasons

for its success, including how engineering disciplines and practices have improved as issues with the SSME have been resolved. The reusable solid rocket booster chief engineer will discuss a lesson on unintended consequences experienced by the element, with both positive and negative effects. In addition, the presentation will look at improvements made to the super lightweight tank as the result of materials testing and upgrades. Finally, these discussions will highlight how integrating new knowledge into existing processes led to improvements in cost, performance, and safety throughout the Space Shuttle program.

Presenters

Katherine Van Hooser, Space Shuttle Main Engine Chief Engineer

Space Shuttle Main Engine: Relentless Pursuit of Improvement

Dennis Moore, Space Shuttle Reusable Solid Rocket Booster-Motor Chief Engineer

Space Shuttle Propulsion: Reusable Solid Rocket Motor Lessons Learned

David Wood, Space Shuttle Reusable Solid Rocket Booster Chief Engineer

Reusable Solid Rocket Booster Lessons Learned

Parker Counts, Owner, Counts Consultants

Super Lightweight Tank: Development Through Flight



About the Module Leads



Jody Singer currently serves in a dual role as the deputy project manager for the Shuttle Propulsion Office (SPO) and as the deputy manager for the Ares Project Office at Marshall Space Flight Center. Appointed deputy project manager of the SPO in October 2007, she has served as the deputy project manager for the Ares Project Office since March 2010. As SPO deputy, she is responsible for the manufacture, assembly, and flight readiness of the primary Space Shuttle propulsion elements: the main engines, external tank, solid rocket boosters, and motors. Over her twenty-five-year career with NASA, Ms. Singer has held numerous leadership roles in the SPO, including manager of the Reusable Solid Rocket Booster Project Office for five years until assuming her current position. In that capacity, she oversaw the work of several hundred NASA and contractor engineers and technicians responsible for the flight safety, performance, and hardware integrity of the shuttle's reusable solid rocket motor and booster hardware. She was also responsible for ensuring the safety and viability of the program through the critical ground-test program.

Ms. Singer was appointed to NASA's Senior Executive Service in 2002 and has received numerous awards during her NASA career, including the Presidential Rank Award for Meritorious Executives—the highest honor for career federal employees—in October 2007. She also received the Space Flight Awareness Leadership Award in 2005, the NASA Outstanding Leadership Medal in 2002, and the Exceptional Service Medal in 1993. She was a Space Flight Awareness Launch Honoree in 1991. Ms. Singer received a BS in industrial engineering from the University of Alabama.



Carolyn S. Griner was employed by NASA, starting as a cooperative education engineering student from Florida State University in 1964 and ending with her retirement after thirty-six years in January 2001 as the deputy center director of Marshall Space Flight Center.

Her technical career included materials and processes ground- and flight-based research, technical and project management, and leadership at the executive levels in NASA. At NASA Headquarters, she managed the Utilization and Operations Division for the Office of Space Station. She returned to Marshall as the director of the Mission Operations Laboratory to manage the technical development of the Payload Operations Control Center for the International Space Station and the flight operations for several Spacelab missions. Ms. Griner managed the Payload Projects Office for Spacelab and attached payload missions on the Space Shuttle. In 1994, she became deputy director of Marshall.

Ms. Griner was awarded the Distinguished Service Medal twice; the NASA Leadership Medal; the NASA Exceptional Service Medal, also twice; the Presidential and Rank of Distinguished Executive and the Presidential Rank of Meritorious Executive, both twice. As a Fellow of the American Astronautics and Aeronautics Association, she has served as a technical director and member of the board of directors and was a past board member of the American Astronautics Society.

She is currently vice president for NASA programs at Science Applications International in Huntsville, Ala.

Module III: Johnson Space Center Space Shuttle Lessons Learned

January 27, 2011



Module Lead

Frank Buzzard, Johnson Space Center (retired)

Retired NASA Space Shuttle Chief Engineer Frank Buzzard will present examples of shuttle lessons learned in two categories—better is the enemy of good enough and flying with design deficiencies. Actual flight experience examples will be used to derive valuable lessons. Examples of successful design upgrades will also be presented.

In addition, Johnson Space Center representatives will share their knowledge regarding the *Columbia* accident organizational communication and how the Mission Operations

Directorate incorporates lessons learned.

Presenters

Frank Buzzard, Johnson Space Center, Space Shuttle Chief Engineer (retired)

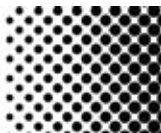
Space Shuttle Lessons Learned

Rodney Rocha, Johnson Space Center, Aerospace Engineer, Structural Engineering Division, Loads and Structural Dynamics Branch

STS-107 Columbia Accident Case Study: Organizational Silence and Communication Breakdown

Jim Azbell, Johnson Space Center, Deputy Division Chief, Space Transportation Vehicle Division, Mission Operations Directorate

MOD Incorporation of Shuttle Lessons Learned

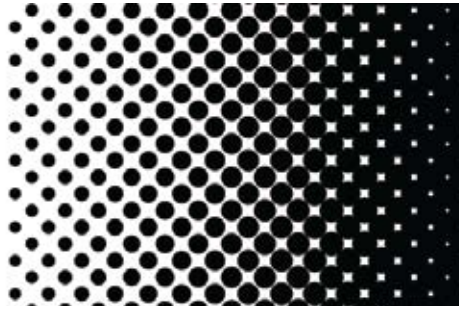


About the Module Lead



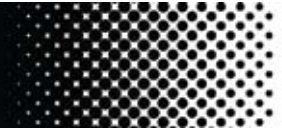
Frank Buzzard spent a distinguished thirty-year career with NASA at the Johnson Space Center, retiring in 2003 after leading the Columbia Investigation Task Force. He then served as Barrios Technology program manager for the International Space Station (ISS) mission integration contract until 2005. During his NASA career, Mr. Buzzard served as chief engineer of the Space Shuttle, chief engineer of the ISS, and ISS program director/senior system integration manager at NASA Headquarters. He received numerous NASA awards, including the Distinguished Service and two Exceptional Service medals.

Mr. Buzzard served as a U.S. Army helicopter pilot for five years, followed by a BS in aerospace engineering with special honors from the University of Colorado in 1974 as the top engineering graduate. He served at General Dynamics, San Diego, as an Atlas Centaur and Titan Centaur trajectory designer before coming to Johnson in 1976. He received an MS in physical science from the University of Houston in 1981. Mr. Buzzard is retired and lives in Bryan/College Station and has an aerospace consulting business, Space Engineering Consulting, Inc.



Additional Resources

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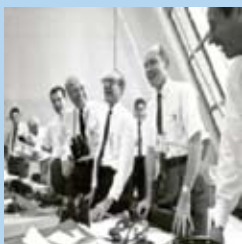
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NASA Lessons Learned Information System

Knowledge is not found with only one person, one project team, or one organization. Sometimes, another project team, or person, knows something that can **help your project** or your task. How do you find “it” or the person who knows “it?” How does knowledge get from one place to another? A face-to-face meeting, e-mail, or telephone are methods traditionally used. The **NASA Lessons Learned Program** enables employees to **share and find knowledge** as easily and as broadly as possible. This system facilitates self-paced and **collaborative learning**. Knowledge sharing at NASA is critical to its success. The NASA Lessons Learned Program assists the agency’s project teams in learning from one another’s **on-the-job experiences** and recommendations for managing and mitigating project risk. Lessons are available by searching the NASA Engineering Network. <http://llis.nasa.gov/>

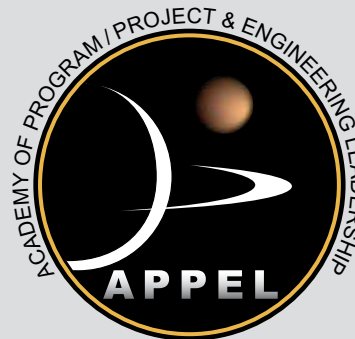


Leadership**Teamwork****Knowledge****Process**

Four skill sets essential to mission success in NASA's project-based environment

Under the Office of the Chief Engineer, the Academy of Program/Project and Engineering Leadership (APPEL) provides leadership, advice, direction, and support for the development and learning of the NASA program/project management and engineering community.

The Academy provides an array of courses, taught by leading industry and NASA practitioners and designed especially for NASA civil servants; facilitates cross-discipline and cross-center knowledge sharing, best practices, and lessons learned through forums, conferences, case studies, the award-winning *ASK Magazine*, and the *ASK the Academy* e-newsletter; and offers team support and individual mentoring by NASA retirees.



Get to know the Academy, an agencywide resource for technical workforce development, by visiting <http://appel.nasa.gov>

Providing leadership training, advice, direction, and support for the development and learning of the NASA program/project and engineering communities

Academy Sharing Knowledge

ask magazine

NASA's *ASK Magazine* gives program and project managers, engineers, and scientists a way to share expertise and lessons learned with fellow practitioners. This is only one way ASK helps share knowledge as part of NASA's Academy of Program/Project and Engineering Leadership.

Stories recounting the real-life experiences of practitioners communicate important practical wisdom and best practices that readers can apply to their own projects and environments. By telling their stories, managers, scientists, and engineers share valuable experience-based knowledge and foster a community of reflective practitioners. The stories that appear in *ASK* are written by professionals just like you, primarily from NASA, but also from other government agencies, academia, industry, and international partners.

Your stories and contributions are what make *ASK* successful, and we invite you to share your ideas for our future issues. Whether it is your own experience or one you heard about, we would love to hear from you. Our editorial staff can help you shape your experience and learning into a compelling story.

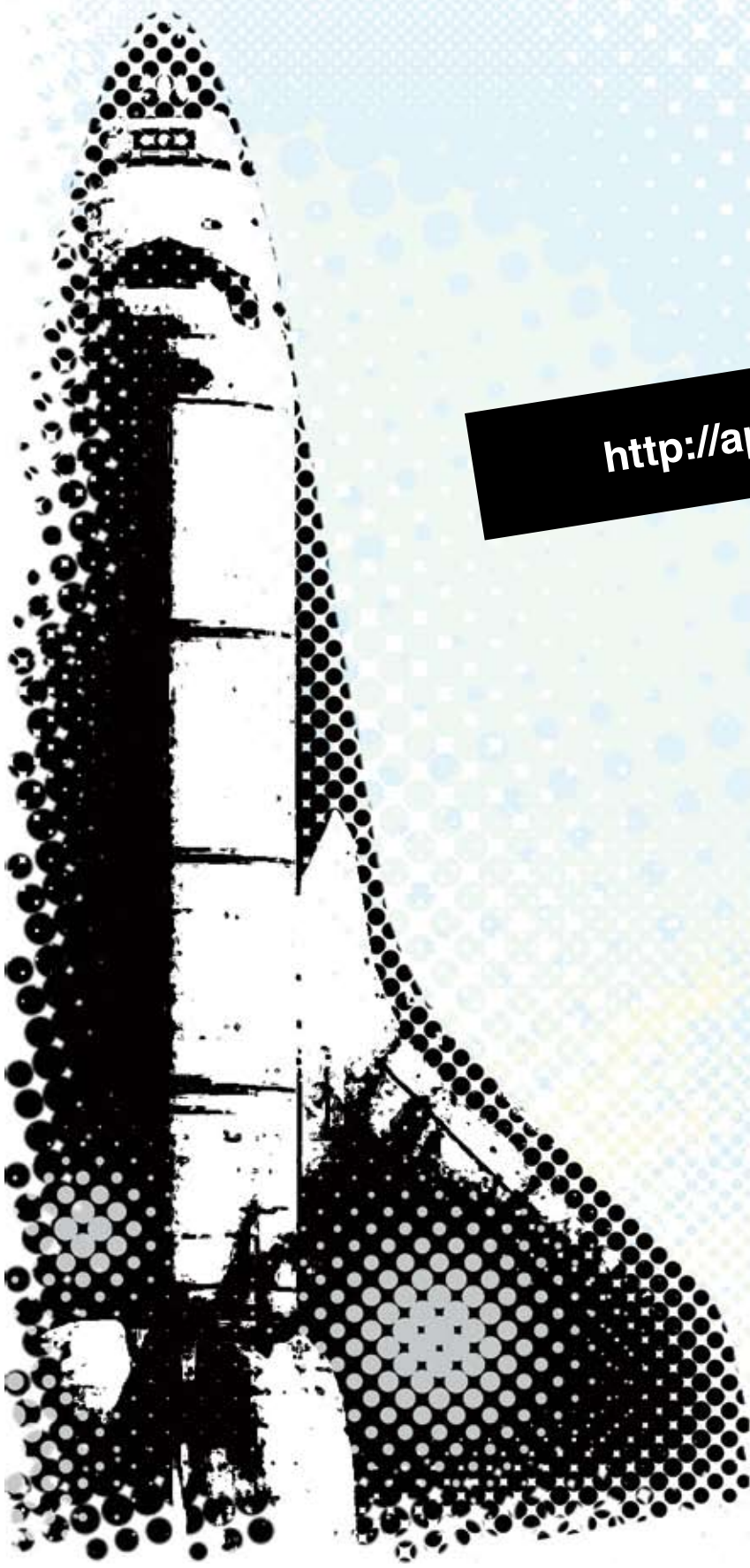
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ask the Academy

ASK the Academy is an e-newsletter from the Office of the Chief Engineer that provides a means for regular communication with NASA's technical workforce about best practices, lessons learned, and new developments at the Agency and throughout the world. Since NASA is a decentralized organization in which experts within various technical disciplines have few opportunities to learn about each other's work, *ASK the Academy* serves as a way to build connections and share knowledge across the agency.

To be added to the newsletter distribution list, send an e-mail with your name, title, and e-mail address to mattkohut@infactcommunications.com.





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