National Aeronautics and Space Administration

Annual Report
Fiscal Year 2013

Academy of Program/Project & Engineering Leadership (APPEL)

www.nasa.gov

aPPEL academy of program/project & engineering leadership

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About the Academy

Before assuming its present structure, the NASA Academy of Program/Project & Engineering Leadership (APPEL) underwent several metamorphoses in response to changing needs at the agency. Beginning with the Program and Project Management Initiative (PPMI) in 1988, which was founded in response to the Challenger disaster, NASA leadership identified a need to develop program and project management excellence in the workforce through training. Ten years later, the agency outgrew the PPMI model as its mission portfolio and workforce evolved. The renamed APPEL grew to place a greater emphasis on curriculum, certification, team performance, and knowledge sharing across NASA.

Since then, the Academy's initiatives have provided support to the agency's technical workforce through its integrated curriculum, team support services, and knowledge sharing activities. In January 2012, a Congressionally established advisory group called the Aerospace Safety Advisory Panel, recommended that NASA establish a single focal point within the agency to develop the policy and requirements necessary to integrate knowledge capture across programs, projects, and centers. In response, NASA appointed its first-ever agency-wide Chief Knowledge Officer (CKO), building upon of the wealth of knowledge sharing activities already underway across NASA, including APPEL.

Over the course of a year, the initiative to develop a more consistent knowledge capability across the agency grew, becoming the primary focus of the CKO. Concurrently, the Academy's work evolved, placing greater emphasis on promoting learning through its curriculum and hands-on development programs for the NASA workforce. Today, APPEL and the CKO have become two distinct, yet integrated entities designed to promote individual, team, and organizational learning through training and knowledge management across the federal government.

Mission

The Academy supports NASA's mission by promoting individual, team, and organizational excellence in program/project management and engineering. Together with the CKO, APPEL seeks to support the agency's technical workforce and continue enabling mission success at NASA.

Goals

- Provide a common frame of reference for NASA's program/project and engineering workforce.
- Provide and enhance critical job skills.
- Support engineering, program, and project teams in the field.
- Promote organizational learning across the agency.
- Supplement formal education programs.

Leadership Team

Mr. Roger Forsgren

Appointed Director of APPEL in February 2013, Mr. Forsgren is responsible for the development of program and project leaders within NASA. He also oversees the development of new discipline engineering training courses and hands-on development programs for engineers at NASA.

Dr. Edward Hoffman

Named NASA Chief Knowledge Officer (CKO) in January 2012, Dr. Hoffman transitioned from his previous role as the founding Academy Director to full-time CKO in February 2013. He is responsible for the agency's knowledge policy and initiatives that integrate knowledge services across NASA's programs, projects, and centers.

Mr. Stephen Angelillo

As the Deputy Director for the Academy, Mr. Angelillo is responsible for strategy, outreach, and operations of the Academy. Mr. Angelillo also manages all aspects of APPEL's training and support through the Academy Center for Excellence (ACE), APPEL's state-of-the-art training facility located at the Kennedy Space Center.

Ms. Christine Williams (Retired 1/3/2014)

Ms. Williams managed the Academy's hands-on systems engineering training and development activities, including the Systems Engineering Leadership Development Program (SELDP) and Project HOPE (Hands-On Project Experience).

Dr. Michael Bell

Dr. Michael Bell is the program manager for NASA's Lessons Learned Information System (LLIS) and works closely with the NASA Chief Knowledge Officer. He is the Chief Knowledge Officer for Kennedy Space Center and also serves as the Dean of the Kennedy Engineering Academy (KEA).

Executive Summary

In Fiscal Year (FY) 2013, NASA and its partners made great strides in a number of areas across its portfolio. As the agency welcomed a new astronaut class, the International Space Station celebrated its fifteenth anniversary in low Earth orbit (LEO). Commercial space partners made progress with increasing U.S. access to LEO, while the Space Launch System and Orion programs progressed to push the boundaries of deep space exploration. The agency successfully launched the Lunar Atmosphere and Dust Environment Explorer (LADEE) to further study the moon and inserted the Landsat Data Continuity Mission (LDCM) into orbit to build on forty years of continuous Earth observation. Additionally, technologies such as NextGen and the Precision Departure Release Capability from NASA's aeronautics programs advanced to improve commercial air traffic control and transportation through more efficient and quieter air travel.

The Academy of Program/Project & Engineering Leadership (APPEL) continued to demonstrate its commitment to the NASA mission by supporting the learning and development needs of the agency's technical workforce.

The Academy was equipped to support the agency's programs and projects in FY 2013 through its activities and services by providing:

- Innovative training and hands-on development offerings to help meet NASA's strategic goals
- Course support for center systems engineering and project management programs
- Online solutions to make learning and development resources readily accessible to practitioners where and when they need it
- Continuing engagement with key stakeholders within the agency such as the Systems Engineering Working Group, Program Management Council, Earned Value Management Focal Point Working Group, and Program and Project Management Board, in addition to partners from government, industry, academia, and international organizations

Concurrently, the NASA Chief Knowledge Officer (CKO) successfully supported the agency's knowledge needs, marking a number of firsts throughout the year:

- Drafting the agency's first knowledge policy, NASA Policy Directive 7120.6 *Knowledge Policy on Programs and Projects*
- Developing and releasing of the agency's first online, interactive knowledge map
- Releasing km.nasa.gov as a go-to online resource for updates about knowledge services across NASA

Ranked first in a global benchmarking study of project academies by Human Systems International, the Academy and CKO continued to receive recognition for its commitment to technical excellence and engineering leadership, and participated in benchmarking activities with government and industry leaders such as the Federal Aviation Administration, National Science Foundation, Embraer, German Aerospace Center (DLR), and Disney.

Orion Capsule Parachute Assembly System (CPAS) drop test using the Parachute Test Vehicle (PTV) at the Yuma Army proving grounds in Arizona.

Photo credit: NASA

Core Business

In FY 2013, the Academy and Chief Knowledge Officer achieved the following in its core areas of activity:

- Facilitated the process for meeting the Office of Management and Budget requirements for the Federal Acquisition Certification for Program/Project Managers (FAC-P/PM), resulting in the certification of 6 new project managers and recertification of 29 project managers, bringing the total to 152 at NASA.
- Trained a total of 3,051 participants in 119 courses.
- Provided yearlong hands-on development opportunities for civil servants nominated to participate in the Systems Engineering Leadership Development Program (SELDP), the Rocket University programs at Kennedy Space Center and Glenn Research Center, and one project through the HOPE (Hands-On Project Experience) Training Opportunity.
- Hosted 10 knowledge sharing events such as Masters with Masters, Engaging Leaders in Knowledge, and the Agency-Wide Case Study Series with NASA's centers, international partners, and industry leaders.
- Published *ASK Magazine* quarterly (99,216 e-subscribers) and the *ASK the Academy* online newsletter monthly (86,479 e-subscribers).*

* Note: Due to website migration activities, values are only reflective of subscriptions through April 2013.

Developing Strategic Capabilities in Advance of Need

NASA Strategic Plan Overarching Goals	APPEL & CKO Activities in FY 2013
Investing in next-generation technologies and approaches to spur innovation	Added five virtual course offerings Distributed ~14,000 total downloads of first iBook on the topic of orbital debris Hosted first public, live-streamed knowledge and leadership event
Inspiring students to be our future scientists, engineers, explorers, and educators through interactions with NASA's people, missions, research, and facilities	Produced final report on inaugural international young professional workshop Captured and disseminated project and mission stories through the Academy's online publications
Expanding partnerships with international, intergovernmental, academic, industrial, and entrepreneurial communities	Integrated and collaborated with the Federal Knowledge Management Working Group Conducted Human Systems working session on organizational project management
Committing to environmental stewardship through Earth observation and science, and the development and use of green technologies and capabilities in NASA missions and facilities	Converted *ASK Magazine* and the APPEL Course Catalog from print publications to a completely digital format
Securing the public trust through transparency and accountability in our programmatic and financial management, procurement, and reporting practices	Developed digital dashboards to track key performance indicators and strengthen accountability Implemented event management software to capture customer feedback, process course surveys, award courses, and distribute course materials

Several new Academy activities aligned with overarching goals outlined in NASA's Strategic Plan.

Innovations and Cost Management

In the reduced budget environment, the Academy and CKO continued to provide high-quality training and development activities and offerings in FY 2013.

- Introduced new virtual courses:
  - Health and Medical Technical Authority Awareness Training
  - Leading Complex Projects
  - Scheduling and Cost Control
  - Technical Writing for the NASA Engineer
  - Project Planning Analysis and Control
- Distributed nearly 14,000 downloads of the Academy's first iBook on orbital debris management as a supplementary course material for APPEL's Orbital Debris Mitigation and Reentry Risk Management course.
- Collaborated with NASA subject matter experts to perform a comprehensive review and revision of the Academy's integrated competency model.
- Introduced mobile learning content and support systems for the Academy website and event management systems to capture course feedback, award courses to centers, and distribute course materials.
- Hosted the agency's first-ever Unmanned Aerial Systems Competition in collaboration with Kennedy Space Center's (KSC) Rocket University program, featuring three young engineering teams from across the agency.
- Partnered with Glenn Research Center (GRC) to launch the GRC Rocket University program.
- Migrated 4,000-plus online assets for the Academy and CKO websites to a new Web platform, reducing costs and maintenance, while increasing capability.
- Partnered with the Marshall Space Flight Center Chief Knowledge Officer to host a "Risk and Innovation" forum.
- Released the agency's first-ever interactive knowledge map to increase awareness of existing knowledge services among the NASA community and its stakeholders.
- Aligned APPEL course costs with agency budget reductions.

The Marshall Space Flight Center "Aero-M" team's competition vehicle, Goose, flying over Kennedy Space Center's Shuttle Landing Facility during NASA's first-ever Rocket University Unmanned Aerial Systems competition.

Photo credit: NASA Marshall Space Flight Center / Adam Kimberlin

Measuring Effectiveness

The Academy and CKO measured its effectiveness in FY 2013 in four primary ways.

Accreditation

- Registered Education Provider of Professional Development Units (PDUs) for the Project Management Institute—all participants in project management courses receive PDUs
- American Council on Education recommends granting graduate credits for 11 Academy courses
- Authorized Provider status with the International Association for Continuing Education and Training (IACET) and past recipient of its exemplar award for internal training

Customer Feedback

- Utilization metrics and user surveys, demand for courses and project team services
- New assignment data and supervisor interviews, meetings with senior leaders at NASA centers and mission directorates
- Requests from senior leadership for studies, papers, articles, case studies, and lessons learned

External Validation

Benchmarking with organizations such as Disney, Federal Aviation Administration, National Science Foundation, Defense Acquisition University, Embraer, German Aerospace Center (DLR), and Shell.

Alignment with NASA Policies and External Requirements

- Office of Management and Budget approval of project management certification process
- Activities supporting NASA's Corrective Action Plan to remove NASA Acquisition Management from the General Accountability Office's (GAO) High Risk List
- Activities responding to direction provided by the Aerospace Safety Advisory Panel
- Alignment with NASA Procedural Requirement 7123.1
- Briefings to NASA management councils and senior leaders

(From left to right) Ed Hoffman, NASA Chief Knowledge Officer, Roger Forsgren, APPEL Director, Jakob van Zyl, Associate Director of Project Formulation at the Jet Propulsion Laboratory, and Dr. Charles Elachi, Director of the Jet Propulsion Laboratory participate in a panel moderated by Akhil Madhani of Disney's Imagineering Research and Development Program at the Disney Ideation Summit in June 2013.

Image courtesy of Disney.

Graduates from the 2013 Systems Engineering Leadership Development Program (SELDP) engage in multiple working group sessions at NASA Headquarters.

Photo credit: NASA APPEL

Building Individual Capability Through Training

The Academy's training curriculum enables NASA's technical workforce to develop NASA-specific expertise and capability in project management and engineering. It is intended to supplement an individual's academic and professional work experience. The curriculum draws extensively on best practices and the knowledge of NASA subject-matter experts to ensure it addresses the needs of the agency's practitioners. The courses are developed following established instructional design processes and include rigorous annual audits and revisions and incorporation of participant feedback.

The Academy's project management and systems engineering competency model provides the basis for all course objectives. The model, which aligns with NASA standards, policies, and requirements, consists of 19 project management competency areas, 3 systems engineering competency areas, and 5 competency areas common to both project management and systems engineering. Together with NASA subject-matter experts, the Academy revised its competency model in 2013 to reflect current definitions and align with updated NASA policies and procedures.

The curriculum includes both core courses and in-depth offerings. Core courses offer a comprehensive, integrated approach to learning and are designed to help participants expand their thinking—to make connections among many systems engineering and project management principles and concepts, see the big picture, and understand the context and interrelationships of the topics.

The Academy also offers a wide variety of in-depth courses in six domains:

- Project Management
- Systems Engineering
- Engineering
- Communication and Leadership
- Earned Value Management
- Mission and Safety

Center Program Support

The Academy continued to integrate with center development programs, providing courses and support critical to the training they provide, including:

- Goddard Space Flight Center's Systems Engineering Education Development (SEED) program and Flight Project Development Program (FPDP) for systems engineering and management
- Core objectives for engineering management processes for Marshall Space Flight Center's Engineering Directorate and the center's system engineering training requirements

- Johnson Space Center's Innovation and Inclusion Initiative, and various center development programs for Orion, Space Launch System, and Commercial Crew
- Ames Research Center's Ames Project Excellence (APEX) development program
- Rocket University programs at Kennedy Space Center and Glenn Research Center (See "Learning Through Hands-On Experience.")

Innovative Offerings

In order to address new and emerging needs, the Academy continued to innovate and build upon its in-depth course offerings. In FY 2013, five courses were piloted and introduced in virtual environments:

- Leading Complex Projects
- Scheduling and Cost Control
- Technical Writing for the NASA Engineer
- Project Planning Analysis and Control
- Health and Medical Technical Authority Awareness Training

In collaboration with the NASA Systems Engineering Working Group, eight of the Academy's systems engineering courses were reviewed and revised to reflect updates made to NASA Procedural Requirement 7123.1. The Academy also collaborated with the NASA Program/Project Management and Control Working Group to review and revise its Project Planning and Analysis Control course to integrate more NASA-specific content into the offering.

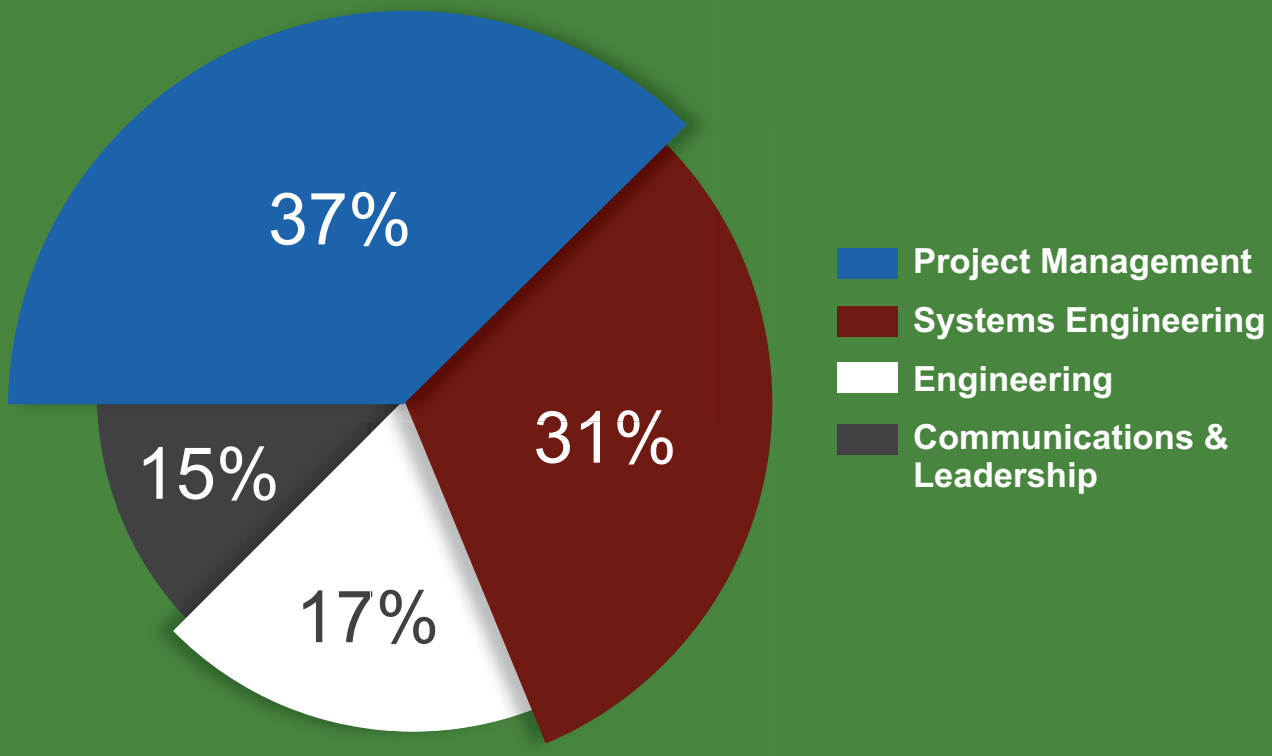
Academy Center for Excellence

The Academy Center for Excellence (ACE), APPEL's state-of-the-art learning facility at Kennedy Space Center, hosted 84 courses in FY 2013. The ACE facility serves as the Academy's primary location for delivering its core courses, and is continually utilized and visited by NASA groups such as Rocket University, NASA's human capital and engineering organizations, and NASA industry and international partners. (See "Learning and Working Through International Collaboration.")

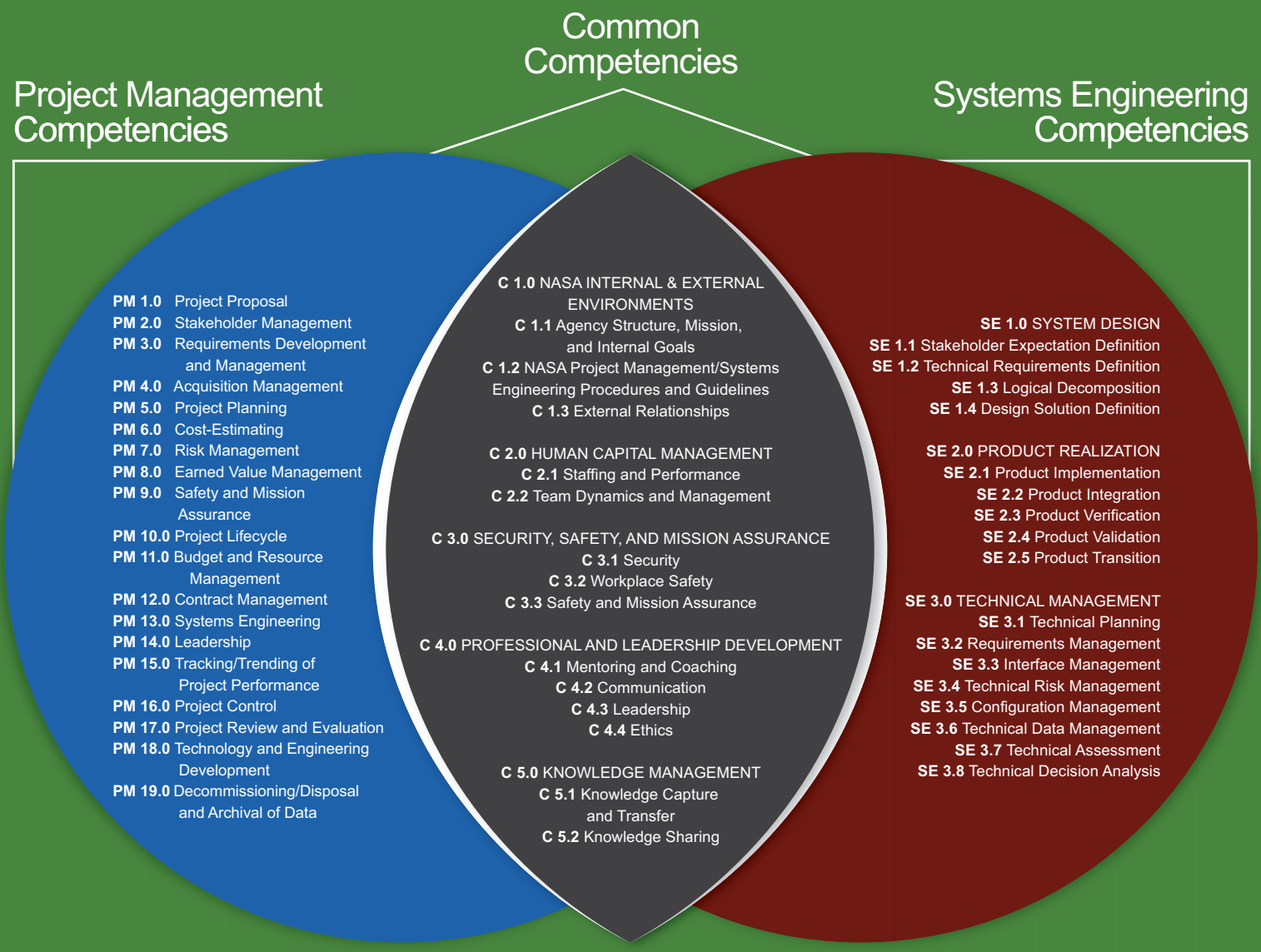
On a scale from 1 to 5 (5 being the highest), participants were asked to rate their satisfaction with the following statements:

- My knowledge and skills increased as a result of this program. The average rating for all course offerings in FY 2013 was 4.04.

- Overall, the course met my needs and expectations. The average rating for all course offerings in FY 2013 was 4.23.



APPEL course requests by curriculum area for FY 2013



The Academy employs an integrated competency model that addresses project management, systems engineering, and shared competencies.

Learning Through Hands-On Experience

NASA's vision and mission demand a workforce with the ability to design, develop, and execute one-of-a-kind projects in aeronautics research, space exploration and technology, and scientific discovery. Formal development programs and hands-on learning provide early- and mid-career professionals with on-the-job learning experiences that accelerate their professional development and readiness to lead.

Systems Engineering Leadership Development Program (SELDP)

The Systems Engineering Leadership Development Program (SELDP) grew out of a need identified by NASA leadership and the Office of the Chief Engineer for an agency-wide leadership development program that would help identify and accelerate the development of high-potential system engineers, with a focus on specific leadership behaviors and technical capabilities that are critical to success in the NASA context. The program aims to develop and improve systems engineering leadership skills and technical capabilities within the agency.

SELDP selects candidates through a rigorous competitive application process. Once participants complete baseline assessments that identify strengths and areas for development, they embark upon a year of learning, developing, and practicing the qualities of a systems engineering leader: creativity, curiosity, self-confidence, persistence, and an understanding of human dynamics.

Throughout the yearlong program, eight participants engaged in a series of courses and workshops on leadership, had a rotational assignment at a new center, and participated in benchmarking visits at Space Systems/Loral and Google. Additionally, participants benefitted from mentoring and coaching, leadership development exercises, and technical training.

The graduates of the 2013 class brought the total number of graduates to 68 systems engineers. The fifth SELDP class began its program with seven systems engineers in August 2013.

> "Ninety percent of SELDP participants transition into more complex and challenging position after they complete the program."

Participant Name, Center	Position Prior to SELDP	Position After SELDP	Comments
Deborah Randall, Armstrong Flight Research Center	**Range Systems Engineer**	**Chief Systems Engineer**, Unmanned Aircraft Systems Integration in the National Airspace System Project	"It is not so much about the title as it is about our effectiveness within our new roles. SELDP provides a new perspective to our job."
Don Whiteman, Goddard Space Flight Center	**Communications Systems Engineer**	**Lead Mission Systems Engineer**, Laser Communications Relay Demonstration Project leading a multiagency technical team developing space and ground systems for the Office of the Chief Technologist	"SELDP was the most significant career growth opportunity I have been given at NASA and has opened doors in areas that would not have been available otherwise."
Matthew Lemke, Johnson Space Center	**Branch Chief**, Electronic Design Branch	**Manager of Avionics, Wiring and Power,** Orion Program	"Without SELDP, I would have been completely unqualified for my current position. SELDP expanded my thinking process from a down-and-in-box level view of systems engineering to an up-and-out vehicle travel perspective."
Keith Naviaux, Jet Propulsion Laboratory	**Group Supervisor**	**Deputy Team Chief,** Mars Science Laboratory	
Alan Crocker, Marshall Space Flight Center	**Systems Management Integration Lead**, ARES V	**Verification and Validation Lead**, Stratospheric Observatory for Infrared Astronomy Program	

Past SELDP participants discuss their career advancement after the program.

HOPE Training Opportunity

Project HOPE (Hands-On Project Experience) is a cooperative workforce development program sponsored by the Academy and the Science Mission Directorate. The HOPE Training Opportunity provides teams of early-entry NASA employees with a chance to propose, design, develop, build, and launch a suborbital flight project over the course of 18 months. The purpose of the program is to enable practitioners in their early careers to gain the knowledge and skills necessary to manage NASA's future flight projects.

Selected in 2012, a young team from the Jet Propulsion Laboratory (JPL) worked through FY 2013 to advance a radiometer system from a Technology Readiness Level (TRL) 4 to TRL 7 and a receiver subsystem from a TRL 4 to a TRL 6 on the CubeSat Hydrometric Atmospheric Radiometer Mission (CHARM) mission. The radiometer will measure microwave radiation at 183 GHz to observe Earth's water vapor line, which is important for understanding Earth's water cycle and energy budget. The instrument is passive, requiring low power and making it an ideal payload for a 3U CubeSat. Typically, this sort of data is collected using much larger satellites such as Aquarius and others found in the A-Train constellation of satellites. Equipping a CubeSat with the JPL-developed radiometer payload is less expensive and lower risk than a large-scale development, serving as a step toward disrupting the paradigm for capturing space-based Earth science measurements. Mid-project, the team transitioned to become the Radiometer Atmospheric CubeSat Experiment (RACE).

Rocket University

Rocket University ("Rocket U" or "RU") is a NASA training and development effort designed to develop and maintain systems engineering and project management skills and technical expertise through coursework, hands-on applications, and practice. Initially created at Kennedy Space Center in 2011, the Rocket U program expanded to Glenn Research Center in 2013. While both programs share a common foundation, each is tailored to meet the learning needs of their center and workforce. Since 2012, the Academy has served as a key partner with NASA's Rocket U programs as part of its commitment to hands-on training and development for the NASA workforce.

In September 2013, the Academy and Kennedy Space Center's Rocket U program teamed up to host the agency's inaugural Unmanned Aerial Systems Competition, featuring young engineering teams from Kennedy Space Center, Marshall Space Flight Center, and Johnson Space Center. The competition served as Rocket U's initial effort to expand the program's reach and encourage interaction and collaboration among engineers across NASA's centers.

Systems Engineering and Integration (SE&I) lead and pilot, Peter Ma, flying the Marshall Space Flight Center development vehicle, Rogue, during early flight testing for the Rocket University Unmanned Aerial System Competition.

Credit: NASA Marshall Space Flight Center / Adam Kimberlin

The Johnson Space Center team, which flew a T-Rex 700 R/C helicopter, goes through their preliminary flight checkouts the day before the Rocket University Unmanned Aerial Systems Competition.

Credit: NASA Marshall Space Flight Center / Adam Kimberlin

"Rocket University allowed me to broaden my experience base beyond my background discipline. Thanks to the opportunities it provided, I received training and hands-on experience in Microcontroller programming, rocket aerodynamic design and trajectory predictions, NASTRAN structural modeling, and even requirements documents such as SMC-S-016, all of which have enabled me to be more productive and has had direct applicability to my work on the Commercial Crew Program".

– John Posey,
Kennedy Space Center Propulsion Engineer

"I see [the Rocket University UAS Competition] as hugely beneficial because the scale of it is small and you get to do the whole gambit of each process. You start off with the classical problem definition, you brainstorm how to solve it, you start taking out hardware and developing software, and then the worst part of all of it, integrating it all together to make it work. It's also the fun part. And then actually seeing it occur. A lot of people will go their whole career and never get to do an entire integration like that on a project. They won't see the whole picture. Whereas these are small scale enough that you can see the entire picture and get a hands-on perspective."

– Mike Goza, Johnson Space Center,
Rocket U UAS Competition Team Mentor

"Everyone gets to go through the full project lifecycle at some point in their career. What we're trying to do with Rocket University is accelerate that because once you go through a lifecycle, you understand the total development process. You understand requirements, preliminary design, integration, and testing. And when you do get on a large flight project, you better understand what you have to do in each of those phases, what to look for, and what to look forward to."

– Gregory Robinson,
Glenn Research Center Deputy Director

CKO – Promoting a Learning Organization Through Knowledge Services

Knowledge services hosted by the CKO are agency-wide resources that 1) promote the development of a community of practitioners who are reflective and geared toward sharing, and 2) ensure that critical lessons and knowledge remain accessible to the workforce. NASA's knowledge network extends beyond the agency to include expert practitioners from industry, academia, other government agencies, research and professional organizations, and international space agencies.

Masters with Masters

Masters with Masters events bring together two expert practitioners to share insights, stories, lessons learned, and best practices in moderated conversations. Videos of the events are captured and distributed through multiple communications channels, including the CKO website, and the Academy's YouTube and iTunes University platforms.

Seven Masters with Masters events took place in FY 2013, including:

- Bob Cabana, **Kennedy Space Center Director**, and Robert Sieck, former **Kennedy Space Center Director of Shuttle Processing**
- Jack Fox, **Kennedy Space Center Surface Systems Office Chief**, and Rob Mueller, Senior Technologist, **Kennedy Space Center Advanced Projects Development, Surface Systems Office**
- Lisa Colloredo, **Kennedy Space Center Commercial Crew Program Associate Manager**
- Anne Caraccio, **Kennedy Space Center Engineering and Technology Directorate Chemical Engineer**, and Philip Harris, **Johnson Space Center International Operations Engineer**
- Dave Mobley, formerly of the **Marshall Space Flight Center Systems Engineering Office**, and Jerry Clubb, former **Division Chief of the Astronics Laboratory** and former **NASA manager of International Partner Avionics Integration for the International Space Station**
- Helen McConnaughey, **Marshall Space Flight Center Division Manager**, and Dale Thomas, **Marshall Space Flight Center Chief Knowledge Officer**
- Dino Brondolo, **Director of Infrastructure Programs at Thales Alenia Space Systems** in Torino, Italy, and Alan Thirkettle, formerly head of **Human Spaceflight Projects Department at the European Space Agency** (organized by NASA in collaboration with the International Program/Project Management Committee)

Engaging Leaders in Knowledge

In February 2013, APPEL's Engaging Leaders in Knowledge series sponsored a public, live-streamed learning event on the topic of "Developing Talent in the Federal Workforce" from NASA TV's studio in Washington, D.C. Human Systems International Group Chairman Terry Cooke-Davies

Engaging Leaders in Knowledge guests engage in a discussion before they step on stage on February 28, 2013. From left to right: G. Clayton Grigg, Chief Knowledge Officer for the Federal Bureau of Investigation; Terry Cooke-Davies, Group Chairman, Human Systems International; Jeri Buchholz, NASA Assistant Administrator for Human Capital Management; Ed Hoffman, NASA Chief Knowledge Officer.

Photo credit: NASA APPEL / Erin Bonilla

Ed Hoffman, NASA Chief Knowledge Officer, discusses techniques to handle an era of program transition with Kennedy Space Center Director Bob Cabana and former Space Shuttle Launch Director Bob Sieck during a Masters with Masters event.

Photo credit: NASA / Jim Grossmann

delivered a keynote address that touched on four primary topics: program management of large engineering projects, program management as part of organizational context, current significant challenges in today's project environment, and the results of a Human Systems benchmarking study of project-based organizations.

Following the keynote, NASA Chief Knowledge Officer Ed Hoffman moderated a panel discussion featuring Jeri Buchholz, NASA Assistant Administrator for Human Capital Management; G. Clayton Grigg, Chief Knowledge Officer for the Federal Bureau of Investigation; and Kathryn Medina, Executive Director, Chief Human Capital Officers Council, U.S. Office of Personnel Management. The panel addressed topics such as young professional development, online learning and training, and leveraging partnerships in a resource constrained environment.

Cooke-Davies and the panelists fielded several questions from virtual participants through Twitter (#NASAelk), Facebook, and the NASA Headquarters UStream channel. The videos were later posted to the Academy's YouTube channel.

Agency-Wide Case Study Series

The agency-wide case study series is an ongoing initiative of the CKO to support and promote knowledge sharing through the case study discussion methodology. The goal of the case study series is to enhance the NASA technical workforce's ability to (1) make critical decisions based on contextual analysis; (2) understand the impact of human factors on decision making; and (3) recognize the relationship between the execution of simple practices and mission/project outcomes. Toward this end, the NASA CKO supports case study discussion sessions at NASA centers, as requested by center CKOs and knowledge points of contact.

In FY 2013, Marshall Space Flight Center hosted two case study forums with moderator Dr. Ed Rogers, Goddard Space Flight Center Chief Knowledge Officer, on the topics of risk and innovation. The first case study forum occurred in April and featured a discussion about the STS-107 mission led by Rodney Rocha, who headed the debris assessment team for the mission. The second forum in September featured Robin Dillon-Merrill, George Washington University professor and expert on risk and decision-making, on the DART mission, examining the changes in risk posture and management expectations for the mission. Both forums also featured panels of senior leaders.

Federal Knowledge Management Working Group

In August 2013, the NASA Chief Knowledge Officer CKO was asked to chair the Federal Knowledge Management Working Group (KMWG), which brings together knowledge management representatives from over 20 different government agencies such as the Department of Justice, Department of State, Central Intelligence Agency, and Department of Defense. Founded in 2011 with the sponsorship of Federal Bureau of Investigation, the community meets quarterly to discuss best practices, current challenges, and emerging trends in knowledge management.

Japan Aerospace Exploration Agency Astronaut Aki Hoshide participates in a third session of extravehicular activity. During the 6-hour, 28-minute spacewalk, Hoshide and NASA Astronaut Sunita Williams (out of frame) completed the installation of a main bus switching unit that was hampered by a possible misalignment and damaged threads where a bolt must be placed. They also installed a camera on the International Space Station 's robotic arm, Canadarm2.

Photo credit: NASA

Learning and Working Through International Collaboration

The importance of international collaboration in space exploration continues to increase as programs become more bold, complex, and expensive. During FY 2013, the Academy and CKO actively collaborated with NASA's international partners through the International Program/Project Management Committee (IPMC) of the International Astronautical Federation (IAF) and the Academy's International Project Management course.

International Program/Project Management Committee (IPMC)

Established 2010, the IPMC provides a forum to promote sharing experiences, information, and approaches to international project management and technical workforce training among the committee's 20 participating space agencies, companies, and professional organizations. NASA's Chief Knowledge Officer serves as the chair of the IPMC.

In March 2013, the IPMC space agency members participated in a workshop to exchange information on the approaches taken to capture and disseminate lessons learned from space projects. The workshop, which took place at the European Space Research and Technology Centre (ESTEC), included approximately 50 attendees from the European Space Agency (ESA), the Japanese Aerospace Exploration Agency (JAXA), the German Aerospace Center (DLR), Centre National d'Etudes Spatiales (CNES), the Korea Aerospace Research Institute (KARI), and several other IPMC member organizations.

The IPMC also supported the organization of the second annual IAF-IPMC Young Professionals Workshop, which brought together for 40 delegates nominated by space agencies, companies, and professional organizations from 18 countries. Held in conjunction with the 2013 International Astronautical Congress, the workshop provided an opportunity for young professionals to share stories, insights, and knowledge about their work experiences and career development opportunities. (See "Meeting the Needs of Young Professionals.")

In addition, the IPMC members supported NASA's efforts to conduct a Masters with Masters session during FY 2013, featuring two seasoned space leaders. (See "Promoting a Learning Organization through Knowledge Services.")

International Project Management Course

In FY 2013, the Academy conducted two highly successful International Project Management courses at the Academy Center for Excellence at Kennedy Space Center. A total of 33 international participants nominated by IPMC member organizations joined approximately 60 NASA participants for the two course offerings, which included modules on the program and project management approaches of ESA, JAXA, CNES, DLR and KARI. The Academy also introduced a new module, which covers the perspectives of space industry participants in collaborative, international projects.

Forty-plus young professionals from across government, academia, industry, and international organizations engaged in a global workshop about their futures and collaborated to author the final report for the 2012 IAF-IPMC Young Professionals Workshop.

Image courtesy of Armonica Film.

Meeting the Needs of Young Professionals

With half of the NASA workforce eligible for retirement, a new generation is poised to enter the technical workforce, making it more critical than ever before to bridge the gap between NASA veterans and early-career employees. In FY 2013, the Academy continued to work with NASA's young professional communities to better understand their professional development needs and provide them with the resources and support they need to grow.

International Astronautical Federation (IAF) - International Project Management Committee (IPMC) Young Professionals Workshop Report

The Academy supported the IAF-IPMC Young Professionals Workshop, which occurred in September 2012 at the International Astronautical Congress. The workshop featured more than 40 young professionals from around the world engaging in discussions about their future careers. The workshop focused the delegates on topics including career opportunities and challenges, mentorship programs, exchanges and rotational assignments, motivating factors for young professionals, and technical and managerial career paths. In February 2013, the IPMC released the final report from the September 2012 workshop, which detailed the conversations of each discussion group and provided conclusions and recommendations to the IPMC member organizations.

Project HOPE and Phaeton Virtual Workshops

The Academy and the Jet Propulsion Laboratory's Phaeton Program hosted a series of virtual workshops featuring participants from past Project HOPE teams. Each session featured presentations from team members about their Project HOPE/Phaeton lessons learned and how the experience contributed to their professional development. The workshop projects and speakers included JPL's Alex Kadesch from CubeSat Hydrometric Atmospheric Radiometer Mission (CHARM) / Radiometer Atmospheric CubeSat Experiment (RACE); MSFC's Jessica Gaskin on the High Energy Replicated Optics to Explore the Sun (HEROES) mission; LaRC's Stuart Cooke on the Development and Evaluation of Satellite Validation Tools by Experimenters (DEVOTE) project; and ARC's Jennifer Dungan on the Coastal and Ocean Airborne Science Testbed (COAST). Recordings of each presentation were made available to NASA employees in SATERN.

The Next Generation on Knowledge Panel at Kennedy Space Center

The Academy and CKO supported and organized a panel of young professionals at Kennedy Space Center (KSC) to share their insights into how the next-generation workforce seeks and shares knowledge across the agency. The four panelists, representing a range of disciplines including systems engineering, chemical engineering, business operations, and information technology, emphasized the importance of activities that bring together agency leaders, seasoned engineers and managers, and young professionals. Throughout the discussion, the panelists identified hands-on training and leadership opportunities as well as access to effective and accessible online tools and search engines as critical components for their successful professional development.

Spaceport Innovators often include knowledge from innovation success stories like the Trash to Supply Gas project, shown here with Chemist Anne Caraccio working on a prototype reactor for incinerating trash in space. She is part of the team developing a mechanism to burn trash and extract valuable gases from the material.

Photo credit: NASA / Dimitri Gerondidakis

Facilitating Open Communication and Dialogue

The Academy invests in communications services and strategies to deliver critical updates, content, stories, and reports to its stakeholders. Its unified, cross-functional team provides support to ensure consistent and professional messaging across various communications channels including its websites, social media, presentations, formal papers, video, interactive graphics, and design. Using a "connect and learn" approach, the Academy communicates to a wide audience to connect practitioners to the people, resources, and knowledge they need in order to learn, grow, and develop as managers and engineers.

APPEL and CKO Websites

Beginning in early 2013, several of NASA's websites, including the Academy website (appel.nasa.gov) and CKO website (km.nasa.gov), underwent a significant transition to update the look, feel, and functionality of its webpages. The Academy successfully transitioned its several thousand online assets, which included course information, knowledge events, images, training information, and a multitude of stories, to a new Web platform.

Twitter

In FY 2013, APPEL nearly doubled its number of Twitter followers to achieve a total of 13,498. It used tweets to share news about significant moments in NASA history, lessons learned on complex projects like Morpheus, new video content featuring aerospace thought leaders, and insights from live-streamed events featuring leaders from across the federal government.

Facebook

The APPEL Facebook page allows for longer updates and asynchronous discussions. Popular among Millennials (ages 18 – 35), visitors were more likely to share, like, or comment when APPEL posted interesting images with a short description and a link back to the larger story on appel.nasa.gov. This strategy continues to prove effective for increasing community engagement and awareness of APPEL.

Flickr

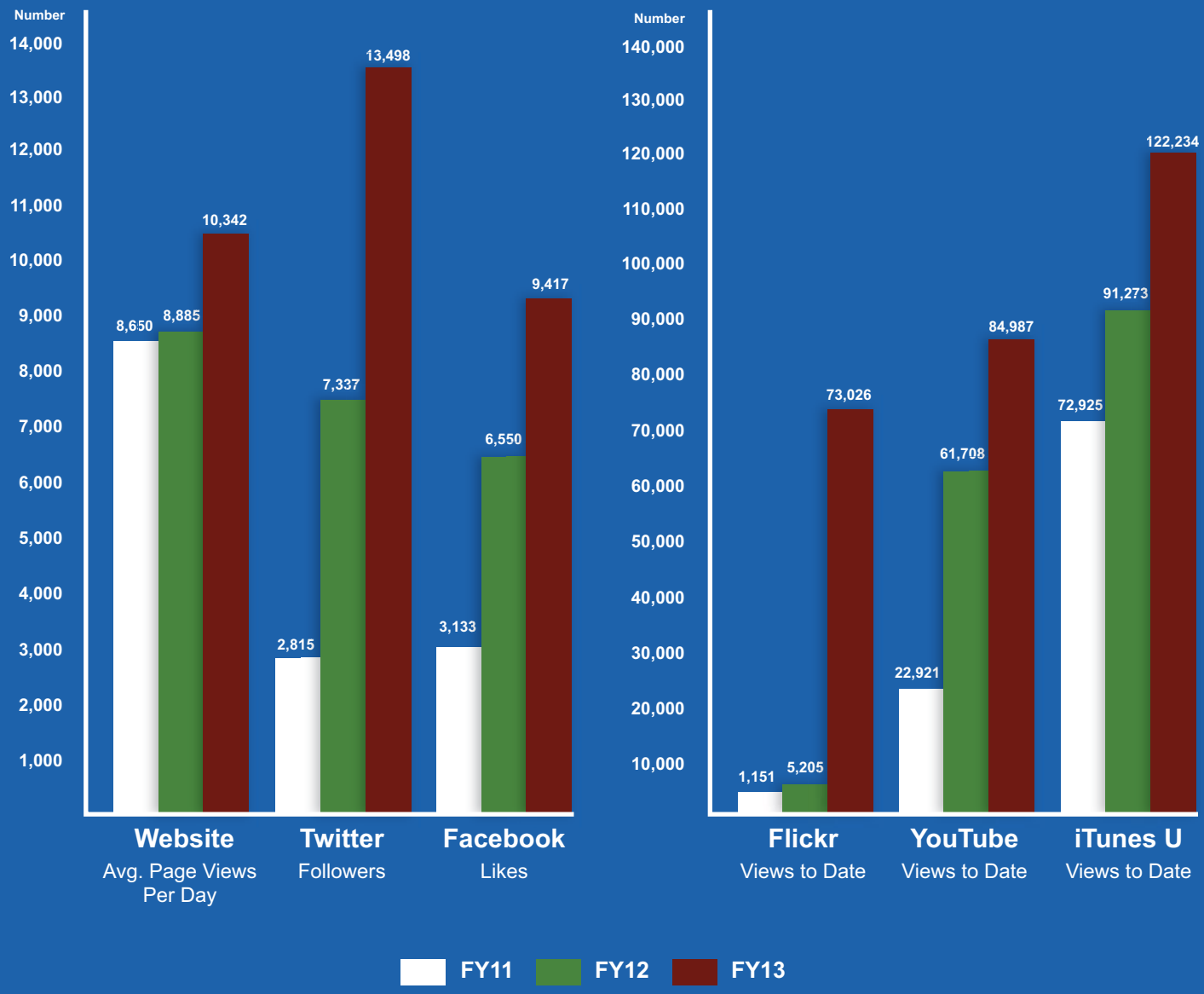
The Academy's Flickr site tells stories using pictures and had great success in doing so in FY 2013. Employing the site to share lesser-known stories and images resulted in a significant increase in page views. Success with posting *ASK Magazine* issues in "20 pictures or less" and content from APPEL's orbital debris iBook contributed to the significant increase in traffic to the site throughout the year.

YouTube

The Academy's YouTube channel provides an easy-to-use platform to share video content with the NASA technical workforce and its stakeholders. Home to recordings of Masters with Masters discussions, presentations by experienced systems engineers, and Engaging Leaders in Knowledge events, the NASA APPEL channel had a 37 percent increase in total lifetime views, bringing the total to 84,987.

iTunes U

In FY 2013, the Academy added to its library of videos and podcasts from thought leaders, master practitioners, and innovative thinkers. Officially released in September 2012, the Academy's iTunes U site distributed nearly 14,000 downloads of its orbital debris iBook and iTunes U course and nearly 8,000 downloads of the Academy's eBook *NASA's Journey to Project Management Excellence* in FY 2013. Other new content included revised curriculum information and interactive versions of *ASK Magazine*.



After a crash, the #Morpheus and #ALHAT teams go on testing—and learning. http://go.nasa.gov/10TBy1y #LessonsLearned

24 June 2013 – Impressions: 109,945 – Retweets: 9 – Replies: 0

A family tree of @NASA_Landsat instruments in one image. http://go.nasa.gov/15QrESQ #Landsat cc @usgslandsat

3 March 2013 – Impressions: 68,506 – Retweets: 6 – Replies: 1

2014 Outlook

In FY 2014, the Academy will continue innovating in order to provide high-quality and effective training, development opportunities, and tools for learning and knowledge to the NASA technical workforce.

The Academy looks forward to introducing and enhancing a number of new resources and programs to better support NASA's practitioners and enhance their learning and development experiences, including:

- Releasing an online interactive APPEL course catalog
- Creating an interactive project management and systems engineering competency model
- Maintaining the practice of continuously reviewing APPEL courses with subject matter experts to ensure alignment with NASA policies and procedures
- Supporting the recertification of 123 NASA holders of the Federal Acquisition Certification for Program and Project Managers (FAC-P/PM)
- Providing additional training opportunities through programs such as Rocket University
- Continuing to partner and collaborate with key stakeholders at NASA and other federal agencies to broaden and strengthen APPEL's curriculum and training activities

The Academy and CKO remain committed to supporting the agency's mission and workforce in this challenging fiscal environment.

Per aspera ad astra.

This visualization shows ocean surface currents around the world during the period from June 2005 through December 2007 and was produced using model output from the join Massachusetts Institute of Technology (MIT) / Jet Propulsion Laboratory ECCO2 (Estimating the Circulation and Climate of the Ocean, Phase II) project.

Photo credit: NASA / Goddard Space Flight Center Scientific Visualization Studio

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