National Aeronautics and Space Administration

NASA Academy of Program/Project & Engineering Leadership Annual Report for Fiscal Year 2011

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Mission

The NASA Academy of Program/Project & Engineering Leadership (APPEL) supports NASA's mission by promoting individual, team, and organizational excellence in program/project management and engineering.

Goals

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

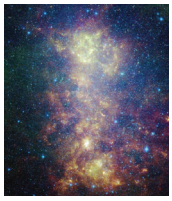
Leadership Team

Dr. Edward J. Hoffman

As the founding director of the Academy of Program/Project & Engineering Leadership, Dr. Hoffman is responsible for the development of program and project leaders and teams within NASA. In this capacity, Dr. Hoffman works both within NASA and externally with leaders of industry, academia, associations, other government agencies, and international partners to establish priorities and enhance capabilities in program/project management and engineering

Mr. Roger Forsgren

As deputy director of the Academy of Program/Project & Engineering Leadership, Mr. Forsgren is responsible for the contractual and financial management of the Academy. He manages all contract, procurement, and budget issues, along with the daily operations of the Academy, and leads the development of new discipline engineering training courses.

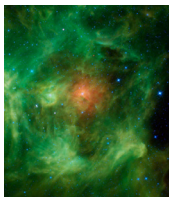


Ms. Christine Williams

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

Dr. Pat Patterson

Dr. Patterson provides oversight for Project HOPE and expertise in the development of training for engineers. He was the founding director of the NASA Engineering Training (NET) program before it merged with the Academy.



Mr. Stephen Angelillo

As the managing director of the Academy Center for Excellence at Kennedy Space Center, Mr. Angelillo oversees all aspects of the management and operations of the facility. He joined the Academy team in FY 2011.

Ms. Heather Rarick

Ms. Rarick, a flight director in the Mission Operations Directorate at Johnson Space Center, served a detail assignment with the Academy during FY 2011.

Executive Summary

2011 marked the beginning of a new era for NASA. With the retirement of the space shuttle after the successful completion of its final missions, the agency embraced a transition to new forms of collaboration with international and commercial partners to reach low-Earth orbit. Science missions such as Aquarius and aeronautics research such as the Integrated Systems Research Program also highlighted the growing importance of innovative partnerships. The consolidation of space operations and human exploration into one mission directorate represented a new level of integration as the agency undertook the development of a heavy launch vehicle that will carry humans deeper into space. In this dynamic context, the Academy of Program/Project & Engineering Leadership (APPEL) was well positioned to anticipate and support new and emerging workforce needs in a number of areas:

- Deepening engagement with international partners
- Expanded support for green engineering and sustainability-related activities
- New activities to support young professionals at NASA and across the aerospace enterprise
- Increased external recognition for NASA's project management certification process and for participants in Academy courses and other professional development activities

Photo Credit: NASA APPEL

Dr. Ed Hoffman tells the story of the Gemini Program at the National Air and Space Museum to a group of project management students from Brazil.

Developing Strategic Capabilities in Advance of Need

Several new Academy activities aligned with the goals of the National Space Policy released in June 2010.

NASA STRATEGIC PLAN OVERARCHING GOALS	NEW ACADEMY ACTIVITIES IN FY 2011
Investing in next-generation technologies and approaches to spur innovation	Distribution of learning materials through iTunes University
	Use of wikis to share knowledge
Inspiring students to be our future scientists, engineers, explorers, and educators through interactions with NASA's people, missions, research, and facilities	Profiles of young professionals in *ASK the Academy*
	Student participation in Masters Forum 20 "Passing the Torch"
Expanding partnerships with international, intergovernmental, academic, industrial, and entrepreneurial communities	First-ever international partner participation in "International Project Managerment" course
	Prepared groundwork for Academy Center for Excellence at KSC to enhance partnering
Committing to environmental stewardship through Earth observation and science, and the development and use of green technologies and capabilities in NASA missions and facilities	Masters with Masters event on sustainability with Office of Strategic Infrastructure and White House
	Piloted Green Engineering course
	Distributed handouts on USB drives
Securing the public trust through transparency and accountability in our programmatic and financial management, procurement, and reporting practices	Published first Annual Report on FY 2010 activities
	Initiated revision of all Earned Value Management training course curricula

Photo Credit: NASA APPEL

Russel Rhodes (standing left) poses a question to Dr. Ed Hoffman (standing right) at Masters Forum 20 in Melbourne, Florida.

Core Business

In FY 2011, the Academy 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 20 new program/project managers, bringing the total to 128 at NASA.
- Trained 3,049 participants in 118 course offerings.
- Provided yearlong hands-on development opportunities for 20 civil servants through the Systems Engineering Leadership Development Program (SELDP) and 19 civil servants on two projects through Project HOPE (Hands-One Project Experience).
- Provided support to 169 project and engineering teams.
- Reached 2,214 participants in nine knowledge sharing events, including PM Challenge 2011.
- Published *ASK Magazine* quarterly (5,500 hard copies and 44,156 e-subscribers) and the *ASK the Academy* e-newsletter monthly (47,194 e-subscribers).

2011

3,043

COURSE PARTICIPANTS

2010

3,192

COURSE PARTICIPANTS

2009

2,228

COURSE PARTICIPANTS

2008

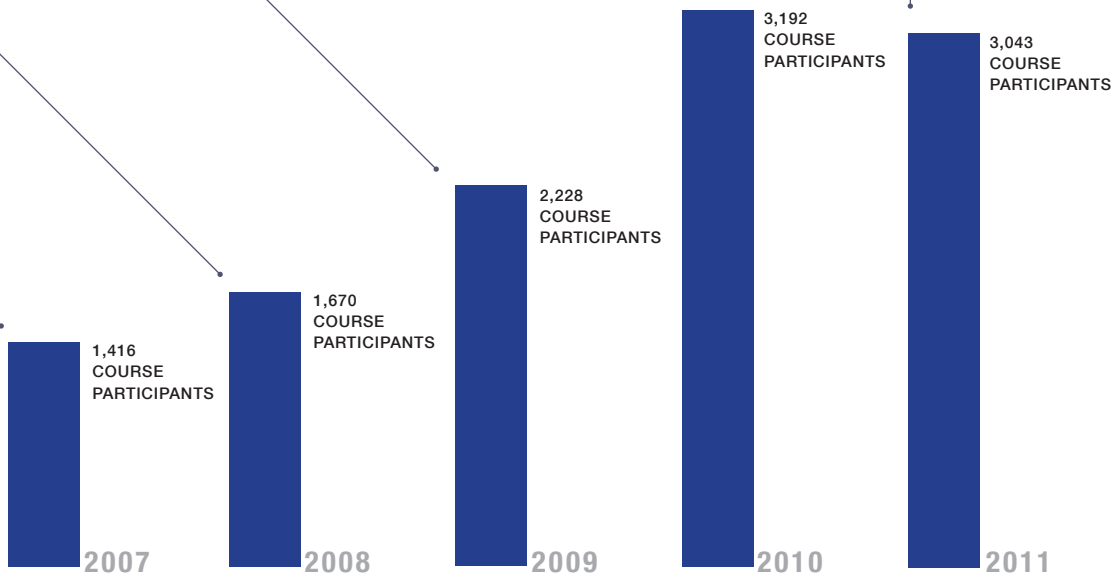
1,670

COURSE PARTICIPANTS

2007

1,416

COURSE PARTICIPANTS



The strong gains in course participation since 2007-2009 were sustained in a constrained fiscal context in 2011.

Innovation

The Academy continued to expand and improve its activities and offerings in FY 2011.

- Introduced new in-depth courses:
  - Green Engineering
  - Pre-Acquisition Analysis, Including Analysis of Alternatives
  - Pre-Acquisition Analysis, Including Analysis of Alternatives for Executives
  - Crucial Conversations
- Redesigned and improved existing courses:
  - Held two fully subscribed offerings of the redesigned "International Project Management," which brought together participants from all NASA centers as well as multiple international and industry partners, and featured modules led by instructors from the European Space Agency (ESA) and the Japanese Aerospace Exploration Agency (JAXA).
  - Redesigned "Project Management & Systems Engineering," shortening the in-class duration from ten days to seven by incorporating technology-enabled learning for offsite work.
  - Expanded "Project Acquisition Workshop" to cover content previously offered in "Integrated Earned Value Management with Acquisitions."
- Began distributing course content to participants on USB drives rather than in hard copy. This will be standard practice for all core courses and in-depth courses of longer duration in FY 2012.
- Convened the first Space Shuttle Lessons Learned knowledge sharing forum, in collaboration with the NASA Lessons Learned program, at Kennedy Space Center.
- Worked with international partners to expand the International Project Management Committee (IPMC) to 19 total space agencies and organizations interested in promoting improved project management on international spaceflight projects.
- Established a channel on iTunes University for sharing multimedia learning content, attracting 72,925 views in under five months.
- Made *ASK Magazine* available in a mobile publishing format.
- Disseminated key knowledge and insights through publications including:
  - A multimedia white paper and wiki to disseminate proceedings and key insights from knowledge sharing events.
  - "Global Trends in Project Management" based on aggregation of trends over three years.
  - Year in Knowledge 2010 anthology.
- Demonstrated commitment to transparency and accountability through publication of first Annual Report.
- Prepared to open the Academy Center for Excellence (ACE), a multidisciplinary learning center for NASA civil servants and partners in industry, government and academia, at Kennedy Space Center on October 1, 2011.

Photo Credit: NASA APPEL

Young professionals Dennis Bonilla (right) and Jon Verville (left) coworking at NASA Headquarters.

Recognition for Quality

The Academy and its people also received recognition for excellence.

- The Project Management Institute (PMI) formally recognized NASA's process for meeting the standards set by the Office of Management and Budget (OMB) for federal project managers. NASA project managers who have been certified by the agency as meeting the Federal Acquisition Certification for Program and Project Managers (FAC-P/PM) standards are now eligible to sit for PMI's Project Management Professional (PMP) exam without further review of their education or experience.

- The International Association for Continuing Education and Training (IACET), the only organization with a continuing education and training standard approved by the American National Standards Institute (ANSI), recognized the Academy as an Authorized Provider.

- The American Council on Education (ACE) announced that international participants in ACE-reviewed Academy courses are eligible for the same benefits as NASA participants (e.g., recommended college credit for participation in any of 12 Academy courses, including "International Project Management"). Participants in ACE-reviewed courses can also now receive a transcript detailing completed classes, recommended college credits and IACET Continuing Education Units (CEUs).

- The Association for Project Management (UK) named Academy Director Dr. Ed Hoffman an Honorary Fellow.

Measuring Effectiveness

The Academy measures its effectiveness in five primary ways:

- **Accreditation** (Registered Education Provider of Professional Development Units (PDUs) for Project Management Institute—all participants in project management courses receive PDUs; American Council on Education recommends graduate credits for 12 Academy courses; Authorized Provider status with the International Association for Continuing Education and Training (IACET))

- **Assessment and Testing** (workforce needs analysis; baseline and post-service assessment results for teams and individuals, including 360-degree feedback)

- **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 Human Systems International (UK), General Motors, Aerospace Corporation, Perot Systems, MIT, and the Management Operations Working Group)

- **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; briefings to NASA management councils and senior leaders)

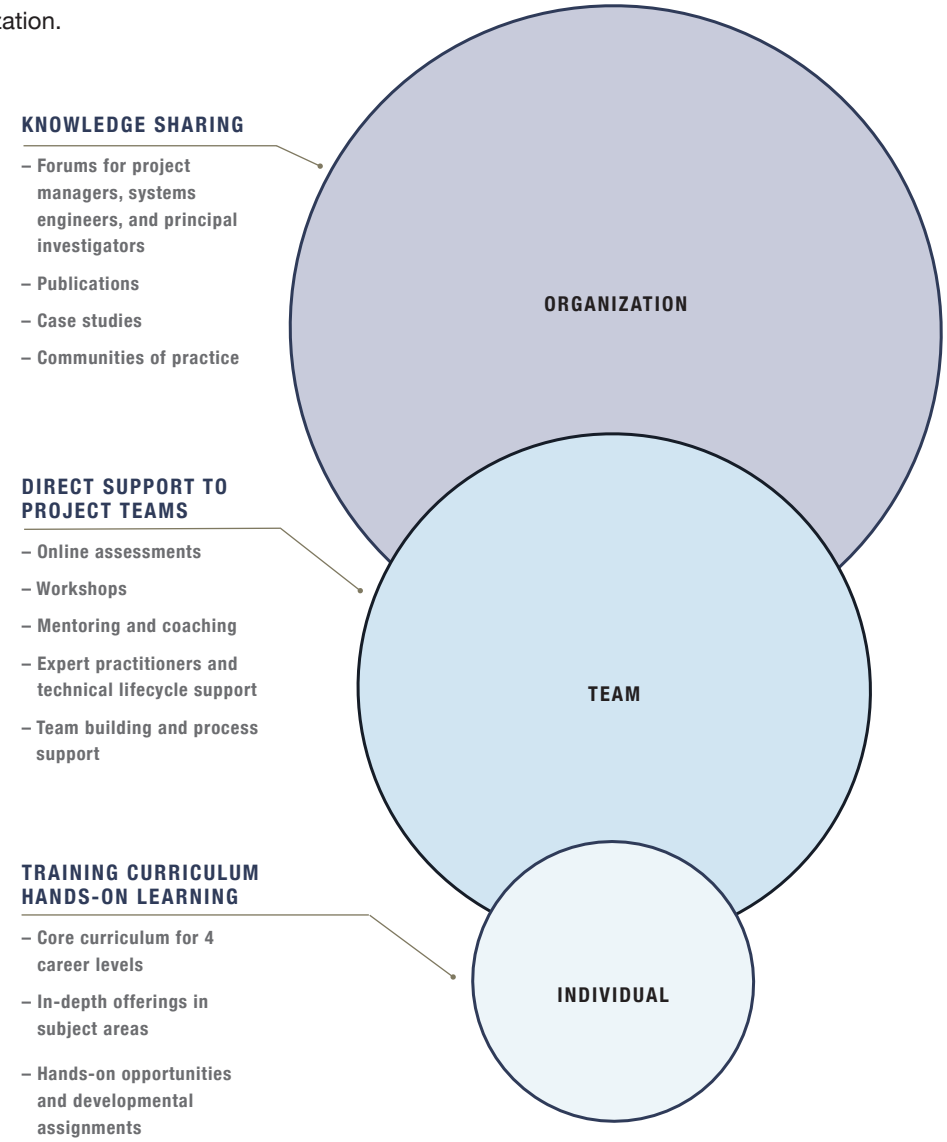
Advancing Development on Three Levels

The Academy focuses its learning activities at three levels: individual practitioners, project teams, and the organization.

- ***Individual practitioners.*** The Academy offers competency-based training, developmental assignments, and hands-on opportunities to help individual practitioners develop their skills at each level of their careers.

- ***Project teams.*** Since most learning takes place within the project team, the best chance of facilitating project success is at the team level. The Academy supports project and engineering teams by offering a variety of tools and services, including: online assessments measuring team performance, workshops focusing on team effectiveness, technical life-cycle support, and intensive coaching, mentoring, and consulting with expert practitioners.

- ***Organization.*** At the agency-wide level, the Academy invests in knowledge sharing strategies that emphasize the power of telling stories through forums and publications in order to help create a community of practitioners who are reflective and geared toward sharing.



The Academy builds individual competence, team performance, and organizational community across NASA.

Photo Credit: NASA APPEL

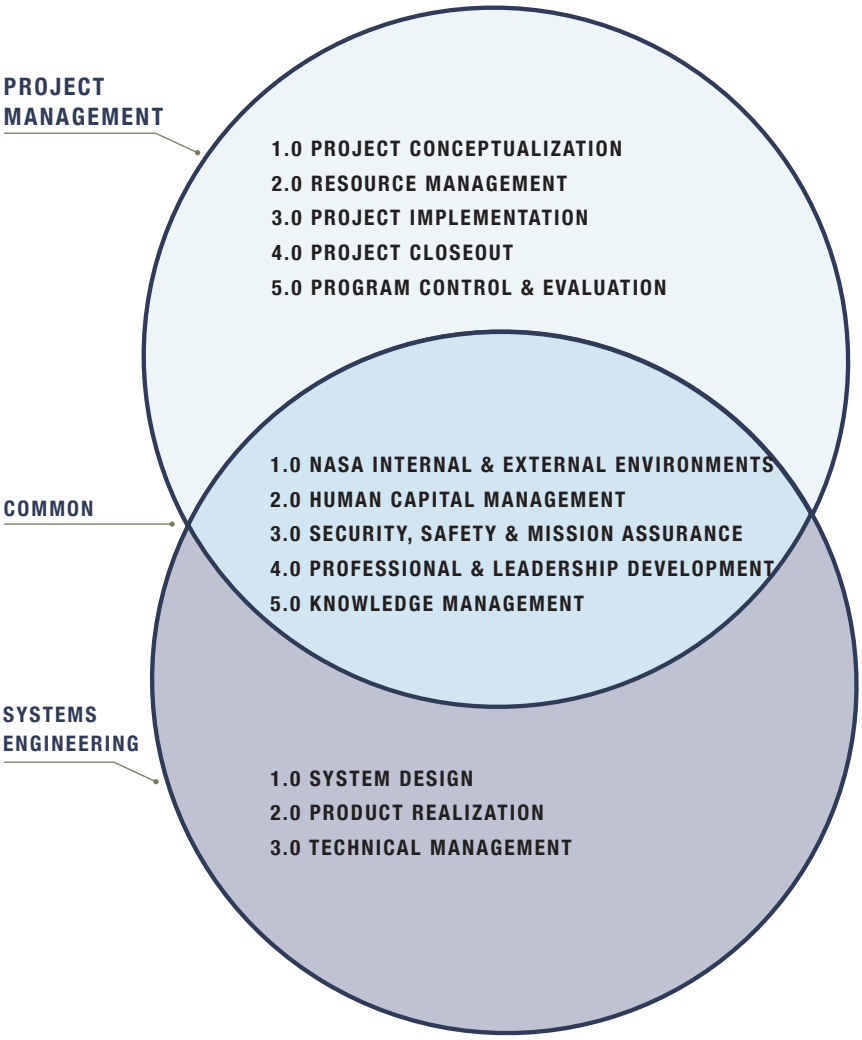
T.J. Elliot, chief learning officer at the Educational Testing Service, shares ideas during a group discussion at Knowledge Forum 4.

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 five project management competency areas, three systems engineering competency areas, and five competency areas common to both disciplines.

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. Topics covered in core courses range from the foundations of aerospace to advanced project management and systems engineering to international project management. The Academy also offers a wide variety of in-depth courses in five domains: project management, systems engineering, engineering, communication and leadership, and program control.



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

The Academy's project management and systems engineering competency model provides the basis for all course objectives.

Innovative Offerings

The Academy continued to innovate and address new and emerging needs through its in-depth offerings, introducing the following new courses in FY 2011:

- Green Engineering
- Pre-Acquisition Analysis, Including Analysis of Alternatives
- Pre-Acquisition Analysis, Including Analysis of Alternatives for Executives
- Crucial Conversations

"Green Engineering" offers a fundamental understanding of green engineering, green technology, life cycle assessment, sustainability, and environmental regulations. Participants gain an understanding of how to integrate various green concepts, materials, disciplines, and tools, and acquire and develop expertise that promotes sound and sustainable practices within the development of systems, processes, and hardware.

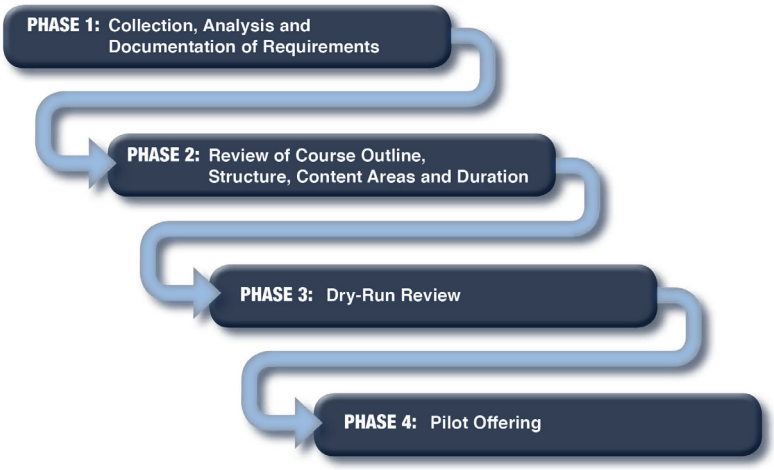
"Pre-Acquisition Analysis, Including Analyses of Alternatives" addresses how analysis supports the major pre-acquisition decisions, as well as discussions of team structure, makeup, functions, and objectives. Participants learn concepts and approaches for doing analysis as a logical foundation upon which to shape major investment decisions.

"Pre-Acquisition Analysis, Including Analyses of Alternatives for Executives" is designed for senior executives who will task, resource, or use the results of pre-acquisition analyses to form organizational requirements or decide what course of action to pursue to meet those requirements. Participants learn to set reasonable expectations for analyses supporting major organizational investment decisions, and to improve communications with the analytic teams supporting them.

"Crucial Conversations" teaches skills for creating alignment and agreement by fostering open dialogue around high-stakes, emotional, or risky topics at all levels of an organization. Participants learn how to handle difficult, emotionally, psychologically, or legally charged conversations with confidence and skill by resolving disagreements, building acceptance rather than resistance, speaking persuasively rather than abrasively, and promoting teamwork.

A Commitment to Continuous Improvement

The Academy's approach to curriculum development and revision employs a rigorous and well-defined process. For core curriculum courses, the process is further formalized to embed stakeholder involvement—from requirements gathering to vendor selection to course content development. Once the need for a new course or course redesign is identified, the Academy's curriculum team conducts a four-phased approach to curriculum development and revision.



The course development and redesign process involves extensive stakeholder input over four phases.

- **Phase 1** involves identifying and convening a diverse team of stakeholders in order to collect detailed course requirements. Course objectives are mapped to the Academy's joint project management/ systems engineering competency model to ensure that they align with the defined competencies.
- **Phase 2** focuses on vendor identification, selection and content development.
- **Phase 3** entails a dry-run workshop, which consists of a condensed version of a course.
- **Phase 4**, which begins upon completion of the dry run, provides an in-depth opportunity for the review team to analyze the course offering and integrate final feedback and recommendations before the course is formally added to the curriculum.

The Academy redesigned and improved two courses in it core curriculum in FY 2011:

- After convening stakeholder representatives from six different NASA centers and multiple Headquarters offices, "Project Management & Systems Engineering" underwent an extensive revision. A key innovation was decreasing the duration of the in-class session from ten days to seven by incorporating technology-enabled learning for offsite work.
- Based on input collected from members of the International Project Management Committee (IPMC), the redesigned "International Project Management" brought together participants from all NASA centers as well as multiple international and industry partners. The course also featured modules led by instructors from the European Space Agency (ESA) and the Japanese Aerospace Exploration Agency (JAXA). Based on the success of the offering in January 2011, a second session was held in July. (See also "Learning and Working through International Collaboration.")

The Academy also revised the "Project Acquisition Workshop" course to cover content previously offered in "Integrated Earned Value Management with Acquisitions."

Photo Credit: NASA APPEL

Participants break out into discussion groups at the Academy's fourth Knowledge Forum, co-hosted with MWH Global in Broomfield, Colorado.

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 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.

In June 2011, 20 systems engineers representing a cross-section of NASA centers graduated from the third SELDP class. Directed by Christine Williams, 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. Program activities include a 6- to 12-month developmental assignment, mentoring and coaching, technical training, leadership development exercises, benchmark site visits, and forums.

The core of the SELDP experience is a hands-on developmental assignment away from the participant's home center and area of expertise. Participants take on systems engineering roles that expand their horizons by challenging them to develop new knowledge and skills in an unfamiliar organizational setting.

The fourth SELDP class began its program in August 2011.

Project HOPE

Project HOPE (Hands-On Project Experience) is a cooperative workforce development program sponsored by the Academy and the Science Mission Directorate (SMD). Project HOPE provides an opportunity for a team of early entry NASA managers and engineers to propose, design, develop, build, and launch a suborbital flight project over the course of a year. The purpose of the program is to enable practitioners in the early years of their careers to gain the knowledge and skills necessary to manage NASA's future flight projects.

The first Project HOPE team, the Jet Propulsion Laboratory's (JPL) Terrain-Relative Navigation and Employee Development (TRaiNED) project, successfully launched in December 2010.

Two teams were selected for the second Project HOPE opportunity: Coastal and Ocean Airborne Science Testbed (COAST), based at the Ames Research Center; and Development and Evaluation of satellite ValidatiOn Tools by Experimenters (DEVOTE), based at Langley Research Center. Both COAST and DEVOTE completed their missions in the first month of FY 2012.

Photo Credit: NASA

Jon Street, External Tank senior engineer from Marshall Space Flight Center and Systems Engineering Leadership Development Program participant, at the 2011 PM Challenge in Long Beach, California.

The Coastal and Ocean Airborne Science Testbed (COAST) mission took place October 21-28, 2011 over Monterey Bay, California, successfully culminating the Hands-On Project Experience (HOPE) project at Ames Research Center. The team executed the first-of-its-kind airborne mission by integrating and flying simultaneously three instruments in the testbed: the AATS sunphotometer, Headwall imaging spectrometer, and, for the first time, the C-AIR radiometers. The instrument suite obtained data during the mission coincident with measurements from MODIS and MERIS satellite sensors, measurements from a research vessel, and at a small set of ground calibration sites.

The DEVOTE (Development and Evaluation of satellite ValidatiOn Tools by Experimenters) project successfully achieved its science goals of: enabling evaluation of next generation satellite retrievals focusing on the ACE Decadal Survey Mission, developing an in situ measurement platform that would be available for frequent and relatively low cost flights, developing advanced instruments, and comparing measurements to satellite and ground based instruments. By the project's end, the DEVOTE team has successfully completed all planned modifications to the aircraft enabling both in situ and remote sensing platforms, flown 12 science flights for over 69 hours, and successfully completed all of its science and training objectives.

Increasing Team Effectiveness

Since most learning at NASA takes place within project teams, the best opportunity for facilitating project success is at the team level. The Academy's services increase a project's probability of success by delivering the right support to a project team at the right time. Through one-on-one assistance, focused workshops, or large group sessions, these activities achieve immediate project goals while enhancing long-term team capabilities.

In FY 2011 the Academy supported 169 project and engineering teams across NASA. Team support includes a variety of tools and services:

- Online assessments measuring team performance
- Workshops focusing on team building, team effectiveness, and leadership
- Technical life-cycle support
  - Requirements development
  - Planning and scheduling
  - Program control analysis
  - Systems integration support
  - Risk management
  - Software management
  - Technical review support
- Coaching
- Mentoring
- Expert practitioner consultations

Photo Credit: NASA APPEL

Systems Engineering Leadership Development Program (SELDP) participants during a group activity at NASA Headquarters during the 2011 SELDP graduation.

Photo Credit: NASA APPEL

Steve Jolly, systems engineer at Lockheed Martin, on camera while presenting at a Principal Investigator Team Masters Forum.

Promoting a Learning Organization Through Knowledge Sharing

The problems that NASA projects seek to solve are novel in nature—they are often "firsts" or "onlies" that demand innovation, knowledge, and learning. The Academy's knowledge sharing activities promote excellence in project management and engineering by using the power of stories to build a community of practitioners who are reflective and geared toward sharing. By facilitating agency-wide knowledge sharing through forums, conferences, publications, and multimedia offerings, the Academy helps ensure that critical lessons and knowledge remain accessible. The Academy's knowledge network extends beyond NASA to include expert practitioners from industry, academia, other government agencies, research and professional organizations, and international space agencies.

Masters Forum 20 – "Passing the Torch 3"

Just months before the retirement of the Space Shuttle, "Passing the Torch 3" 2011 provided an opportunity for master practitioners from the Space Shuttle and Constellation programs to reflect on some of the lessons learned from the formulation, development, and operations of their programs and to look forward and anticipate future space transportation systems requirements. This forum, an encore of the highly successful Masters Forums 18 and 19 held in 2009 and 2010, was a collaborative effort among the Academy, NASA Headquarters Public Affairs Office, and Kennedy Space Center's Public Affairs Office. "Learning from the past and preparing for the future—it's the key to being successful," said Bob Cabana, director of Kennedy Space Center (KSC) and a former astronaut, at the kickoff of the forum.

The program included several panel discussions, including one dedicated to young professionals from various NASA centers and academia chaired by Heather Rarick, a flight director for the International Space Station who served a detail assignment with the Academy in 2011. Haley Stephenson provided an overview of the Academy's Young Professionals Initiative, which aims to meet the development and training needs of the young professional workforce at NASA.

Principal Investigator Team Masters Forum 3

The Academy conducted its third Principal Investigator (PI) Team Masters Forum July 7-8, 2011, in Annapolis, Maryland. The forum, a collaborative effort between the Academy and NASA's Science Mission Directorate, brought together teams from the Discovery mission announcement of opportunity (AO) process and the Mars 2016 Trace Gas Orbiter mission to gain a better understanding of the role of a Principal Investigator (PI) at NASA. Master practitioners from past science missions shared stories, perspectives, lessons learned, and best practices with their colleagues. The proceedings from the forum were published in a multimedia wiki that will be updated after subsequent PI forums.

Project Management Challenge

The Project Management (PM) Challenge is an annual training event that brings together the best speakers, discussion panels, case studies, and networking opportunities in program/project management, systems engineering, safety and mission assurance, team building, business management, and many other key aerospace disciplines. The Academy co-sponsored PM Challenge 2011 with the Office of the Chief Engineer.

The 2011 event, which took place February 9–10 in Long Beach, California, featured more than 100 learning sessions on topics ranging from risk management to political savvy, including the second annual track dedicated to international project management. (See "Learning and Working through International Collaboration.") Presentations by Academy team members covered topics including global in project management, Project HOPE, and lessons from the BP Deepwater Horizon accident.

Masters with Masters

Masters with Masters events bring together two expert practitioners to share insights, stories, lessons learned, and best practices in a moderated conversation. The Academy develops podcast-quality videos of the events that are distributed through multiple channels, including its website, YouTube, and iTunes University. The Academy hosted six Masters with Masters events in FY 2011:

- Charlie Bolden, NASA Administrator, and Jean-Jacques Dordain, European Space Agency (ESA) Director-General (in collaboration with International Astronautical Federation and ESA)
- Bobby Braun, NASA Chief Technology Officer and Steve Altemus, Johnson Space Center Engineering Director
- Charlie Bolden, NASA Administrator, and Johann-Dietrich Wörner, Chairman of the German Aerospace Center (DLR) Executive Board (in collaboration with DLR)
- Rob Manning, Mars Exploration Program Chief Engineer at the Jet Propulsion Laboratory, and Dr. Rudolf (Rudi) Schmidt, ESA Program Manager and former Project Manager of Mars Express and other planetary missions (in collaboration with ESA)
- Olga Dominguez, NASA's Assistant Administrator for the Office of Strategic Infrastructure; Michelle Moore, Federal Environmental Executive with the White House Council on Environmental Quality; and Dr. Brian Nattrass, co-founder of Sustainability Partners and author of several books on sustainability
- Bill Gerstenmaier, NASA Associate Administrator for Human Exploration Operations, and Dr. Kuniaki Shiraki, Executive Director of the Human Space Systems and Utilization Mission Directorate at the Japan Aerospace Exploration Agency (JAXA)

Photo Credit: NASA APPEL

Bill Gerstenmaier, NASA's Associate Administrator of Human Exploration Operations, and Dr. Kuniaki Shiraki, Executive Director of the Human Space Systems and Utilization Mission Directorate at the Japanese Aerospace Exploration Agency (JAXA), participate in Masters with Masters 9.

Space Shuttle Lessons Learned Knowledge Forum

In collaboration with NASA Lessons Learned Steering Committee, the Academy convened a Space Shuttle Lessons Learned Knowledge Forum at Kennedy Space Center in January 2011. Participants included representatives from Kennedy Space Center, Marshall Space Flight Center, and Johnson Space Center; the Agency Lessons Learned Steering Committee members; and the authors of case studies. Presenters and facilitators included Space Shuttle subject matter experts and Shuttle managers who shared first-hand knowledge and personal insights and reflections about case studies and materials. Participants learned about the agency Lessons Learned Information System (LLIS), NASA's case study knowledge capture process, and Space Shuttle case studies and lessons learned.

Knowledge Forum 4

The effective use of knowledge is critical to the success of NASA's missions and the organization's long-term sustainability. Knowledge forums are small, engaging one-day events that address different aspects of knowledge acquisition, capture, and transfer. The forums feature leading experts and practitioners who deal directly with knowledge-related challenges, and emphasize informal discussions and networking in order to cultivate a vibrant knowledge network that can benefit NASA. The Academy co-hosted Knowledge Forum 4 in 2011 with MWH Global, an environmental engineering and water resource management firm headquartered in Broomfield, Colorado. Participants at the forums included: representatives from NASA centers; knowledge experts from MITRE, the World Bank, Educational Testing Service; and thought leaders from academia and the private sector.

Photo Credit: NASA APPEL

Olga Dominguez, NASA's Assistant Administrator for the Office of Strategic Infrastructure, Michelle Moore, Federal Environmental Executive with the White House Council on Environmental Quality, and Dr. Brian Nattrass, co-founder of Sustainability Partners, talk about organizational sustainability in Masters with Masters 8.

Photo Credit: NASA APPEL

NASA young professionals cowork at the Johnson Space Center collaborative Sp.ace.

Learning and Working Through International Collaboration

Space exploration has always been an international endeavor. In recognition of the increasing importance of international collaboration in space, and in consideration of the mutual benefit of sharing experiences and best practices, the Academy has undertaken new efforts, in close collaboration with the Office of International and Interagency Relations, to learn from and with NASA's international partners.

International Track at PM Challenge

PM Challenge's second international track featured practitioners from several space agencies as well as representatives from the global aerospace industry. With international cooperation and collaboration playing an increasing role in NASA's future, this event provided an opportunity for NASA to bring together partners from around the world to share perspectives, challenges, and opportunities.

Topics for the track included: lessons learned from the International Space Station; perspectives on international collaboration from the European Space Agency (ESA); the challenges of climate monitoring from space; space project management in Asia; lessons from the F-35 aircraft program; issues facing new and emerging space-faring nations; an overview of the International Project Management Committee (see below); and challenges and opportunities facing young professionals in the aerospace industry.

Speakers included representatives from: *Aviation Week*; Canadian Space Agency (CSA); Czech Space Office (CSO); European Space Agency (ESA); German Aerospace Center (DLR); Human Systems (UK); INVAP (Argentina); Japan Aerospace Exploration Agency (JAXA); Korea Aerospace Research Institute (KARI); Lockheed Martin; Project Management Institute (PMI); Space Commercial Services (South Africa); Space Generation Advisory Council; and Thales Alenia. NASA speakers included senior leaders from the Space Operations Mission Directorate, the Earth Science Division of the Science Mission Directorate, the Office of International and Interagency Relations; and the Office of the Administrator.

International Project Management Committee (IPMC)

In its first year, the International Program/ Project Management Committee (IPMC), a forum organized under the auspices of the International Astronautical Federation to promote sharing experiences, information, and approaches to enhance collaboration on international projects, expanded to 19 members, including 11 space agencies, six industry partners, and two professional organizations.

After IPMC members reviewed materials from the Academy's "International Project Management" (IPM) course in FY 2010, the Academy revised the curriculum and offered the redesigned course for the first time in January-February 2011 at Kennedy Space Center. The session brought together participants from all NASA centers as well as CSA, ESA, DLR, JAXA, KARI, and four industry partners (Astrium, Thales Alenia, INVAP, and Comau). The course also featured instructors from ESA and JAXA. Based on the positive response to that offering, the Academy hosted a second IPM course in July at Kennedy Space Center, integrating feedback gathered during the winter session. Both sessions were fully subscribed.

IPCM members also participated in four Masters with Masters sessions during FY 2011. (See "Promoting a Learning Organization through Knowledge Sharing.")

Photo Credit: NASA

The 2011 Systems Engineering Leadership Development Program (SELDP) class takes a tour through the wind tunnel at Ames Research Center.

Enabling Innovation and Improvement

Research is essential to the Academy's commitment to innovation and continuous improvement of its ability to serve NASA's workforce. Through quantitative and qualitative studies of select topics, the Academy ensures that its products and services leverage the latest methodologies and knowledge. Research also contributes to agency efforts to design learning strategies that anticipate future needs for workforce development.

Young Professional Study

The Academy collaborated with *Aviation Week* and industry leaders on the second annual Young Professional Study. The survey identified the top factors in young professionals' career decisions as technological and intellectual challenge, benefits (e.g., health care, investment plans, advanced degrees, learning, and flexibility), location, and the opportunity to advance. The top frustrations were bureaucracy and politics; over half of those surveyed believe that the pace of decision-making, progress, and management of change are not what they could or should be. Eleven companies participated in the 2011 study of the under-35 workforce.

Trends in Project Management

The Academy completed its annual study of trends in project management, which Academy Director Dr. Ed Hoffman presented at PM Challenge 2011 in Long Beach. In addition to identifying new trends toward frugal innovation, transparency, and smart networks, the 2011 analysis looked back over three years and found that trends fell into three broad categories of change: the global business environment, the priorities of project-based organizations, and the work environment for project practitioners.

The Academy's research into trends in project management over a three-year period led to the identification of three broad categories of change. The annual trends analysis draws on an extensive literature review as well as exchanges with colleagues in the global project management community.

Photo Credit: NASA

Systems Engineering Leadership Development Program (SELDP) participants visit the General Motors Technical Center in Warren, Michigan.

Facilitating Open Communication and Dialogue

Communication is central to all leadership and management challenges. The complexity of NASA's programs and projects demands an open, vigorous culture in which communication is continuous, empowering individuals at all levels to ask questions, share information, and raise concerns. The Academy is committed to promoting open communication through a number of channels.

ASK the Academy, a monthly e-newsletter, serves as a means of regular communication with the agency's technical workforce about best practices, lessons learned, and new developments at NASA and throughout the world. In 2011 it reached more than 47,000 online subscribers. ASK Magazine delivers insight each quarter with stories recounting real-life experiences that communicate important practical wisdom and best practices. Reaching 5,500 print subscribers and more than 44,000 online subscribers, ASK allows NASA managers, scientists, and engineers, as well as global practitioners, to share valuable experience-based knowledge and foster a reflective community.

The Academy also develops case studies about NASA missions and complex engineering projects that emphasize key decision points. Cases published in 2011 included "*Columbia*'s Last Mission," "Weathering the Storm: Lessons from Hurricane Ike," and "The Deepwater Horizon Accident: Lessons for NASA."

In 2011, Academy team members received numerous invitations to present to professional associations and external organizations, including:

- International Astronautical Congress
- Project Management Institute
- United Kingdom Ministry of Defense
- Columbia University
- University of Maryland
- Thales Alenia
- *Aviation Week*
- International Centre for Complex Project Management
- Portland International Center for the Management of Engineering and Technology

Photo Credit: NASA APPEL

From left to right: Eugene Bounds (Project Management Institute), Carole Hedden (Aviation Week), Stacey Edgington (NASA Headquarters), Agnieszka Lukaszczyk (Space Generation Advisory Council), and Justin Kugler (Johnson Space Center) discuss developing the international aerospace young professional community at the 2011 NASA Project Management Challenge.

The Academy uses social media sites to spread the word about its events, forums, publications, and multimedia offerings and to expand its community through online engagement. In FY 2011, it experienced notable growth in its online presence and engagement with its various online communities, including:

- Over 90,000 views of APPEL multimedia content on YouTube and iTunes U (see below).
- 124 percent increase in followers on Twitter and 74 percent increase on Facebook.

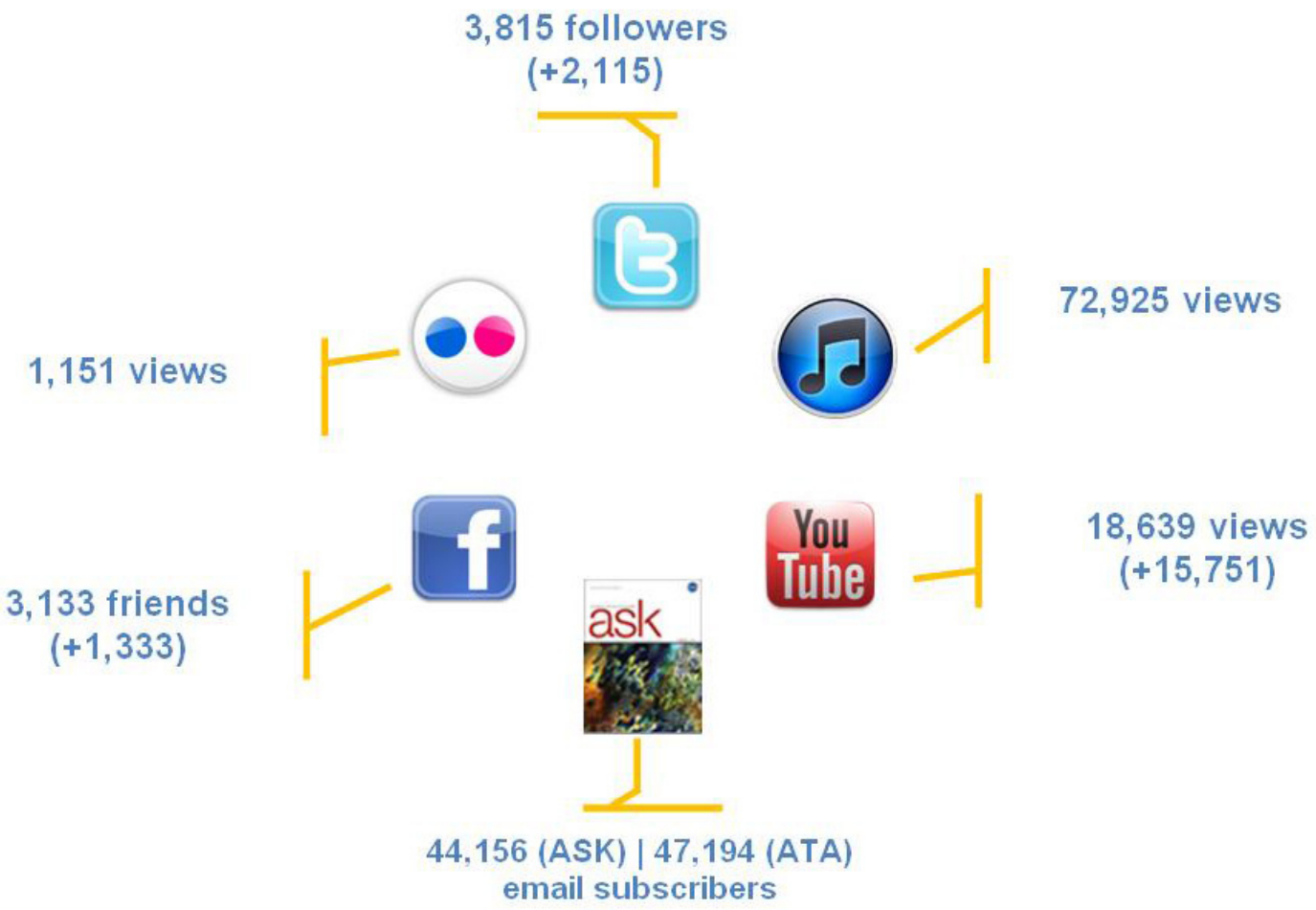
The Academy released the first wave of content on its iTunes University site in May 2011 as part of an effort to integrate technology-enabled learning tools into its offerings, allowing it to reach broader audiences, decrease training costs by minimizing the need for travel, and provide on-the-go learning materials.

iTunes U

Account Name: NASA APPEL

Account Created: May 12, 2011

Lifetime worldwide views: 72,925

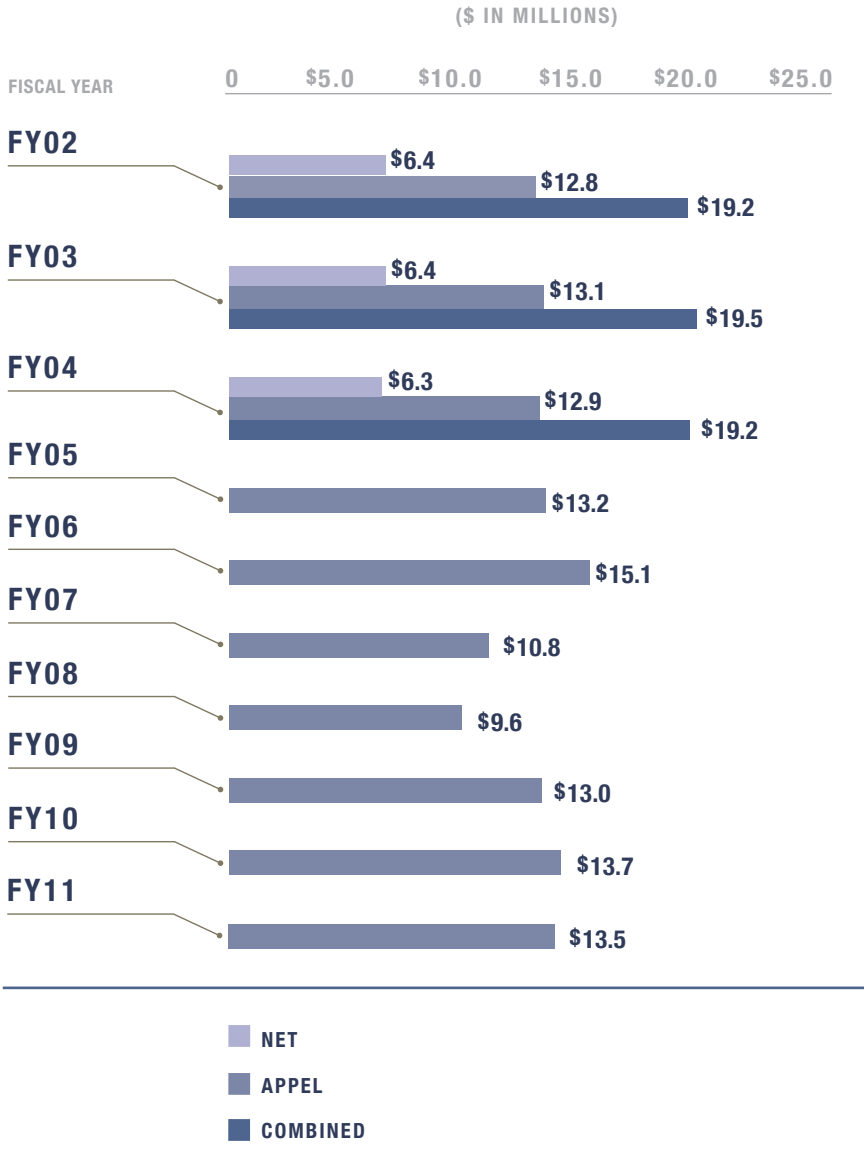


The Academy employed new social media channels in FY 2011 to share knowledge and ideas.

Financial Review

The Academy's funding in FY 2011 enabled it to respond to 40% of requests from NASA centers for course offerings. Demand for team support and knowledge sharing forums also outstripped available resources.

The Academy's long-term ability to meet the needs of NASA's workforce continues to call for investments in technology-enabled learning. Strategic investments in this area are already increasing the Academy's efficiency and performance, as seen with the redesigned "Project Management and Systems Engineering" course, which employed technology-based solutions to shorten in-class days from ten to seven. Further investments like this will enable greater participation among civil servants as well as international partners and address the needs of young professionals for more interactive and immersive learning.



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