APPEL Briefing for Program Management Council

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NASA Academy of Program/Project & Engineering Leadership
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PMC Action Statement

**PMC Action**: Provide a briefing to the Agency PMC on OCE APPEL's professional development framework and services for NASA program/project managers and engineers, including its training curriculum, progress toward meeting OMB PM certification requirements, direct support for project teams, and knowledge sharing.*

* Per direction of the Acting Administrator, the scope of this action was broadened to provide the professional development context in which project management certification is taking place.
OMB PM Certification Requirements

Requirements:
Essential agency responsibilities for program administration are included below:

- identify and assess the program and project management acquisition workforce
- develop this workforce in accordance with the standards
- issue FAC-P/PMs
- monitor continuous learning achievement

(Source: “OMB Memorandum for Chief Acquisition Officers,” April 25, 2007, p. 3.)
PM Certification Support

Progress:
- Created a certification process for OMB approval
- Established agency performance goal for PM certification
- Provided Center Implementation Guidelines outlining a common process
- Met with PPMB, PMC, and center technical and human capital POCs to obtain concurrence on certification process
- Created tools and resources for implementation
- Collaborated with SATERN to build capability to record certification status
- Established continuous learning requirements unique to NASA for certified P/PMs

Next Steps:
- Awaiting OMB approval of NASA’s approach
- Monitoring and providing support to Centers for meeting the established timelines
- Integrating APPEL project management and systems engineering competencies into SATERN
- Updating SATERN system to accommodate tracking of continuous learning requirements
Initial P/PM Certification Targets

Certification Targets

By October 2009, certify 100% (n=69) of P/PMs managing major acquisitions (>250M LCC), including high-visibility projects and/or large sub-systems or elements with lower $ value:

- 33% (23) certified by May 2009
- 67% (46) certified by July 2009

(Targets reviewed by PMC March 2009)

<table>
<thead>
<tr>
<th>Center</th>
<th>PGMs</th>
<th>PMs</th>
<th>Total</th>
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<tbody>
<tr>
<td>ARC</td>
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<td>1</td>
<td>1</td>
</tr>
<tr>
<td>DFRC</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>GRC</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GSFC</td>
<td>6</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>JPL</td>
<td>3</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>JSC</td>
<td>4</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>KSC</td>
<td>1</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>LaRC</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>MSFC</td>
<td>2</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>SSC</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>51</strong></td>
<td><strong>69</strong></td>
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</table>
Leveraging APPEL’s Support: 
an Agency-wide Resource 
for Technical Workforce Development
APPEL Mission and Goals

MISSION
To support NASA’s mission by promoting individual, team, and organizational excellence in program/project management and engineering through the application of learning strategies, methods, models, and tools.

GOALS
• Provide a common frame of reference for NASA’s technical workforce.
• Provide and enhance critical job skills.
• Support engineering, program and project teams.
• Promote organizational learning across the agency.
• Supplement formal educational programs.
APPEL has employed a competency-based approach to career development since the mid-1990s.

Key assumptions:
- Practitioners know best.
- 85-90% of learning takes place on the job.
- Learning is contextual — different career stages have different requirements.
- Optimal performance and learning come together at the team level.
Continuous Learning for the Technical Workforce

**Approach**
- Training curriculum
- Hands-on assignments

**Activities**
- Core curriculum for 4 career levels
- In-depth offerings in subject areas
- Project HOPE: partnership with SMD to provide hands-on opportunities
- SELDP

**Direct support to project teams**
- Online assessments
- Workshops
- Mentoring and coaching
- Expert practitioners
- and technical lifecycle support
- Team building and process support

**Knowledge sharing**
- Forums for project managers, systems engineers, and principal investigators
- Publications
- Case studies
- Communities of practice
4-Level Career Development Framework

**EXECUTIVE LEVEL**
**PROGRAM OR VERY LARGE PROJECT MANAGER**

Core: *Executive Program*
- Mentoring; Administrator’s Executive Forum
- Leadership by example in knowledge sharing

**LEARNING STRATEGIES**
- Cohort selected by NASA senior leaders

**MID-CAREER**
**LARGE PM OR SYSTEMS MANAGER**

Core: *Advanced Project Management & Systems Engineering*
- Mentoring
- In-depth courses; rotational assignments
- Participation in knowledge sharing activities

**MID-CAREER**
**SMALL PROJECT MANAGER OR SUBSYSTEM LEAD**

Core: *Project Management & Systems Engineering*
- In-depth courses; team lead assignments; Project HOPE
- Attendance at technical conferences or knowledge sharing activities

**ENTRY**
**PROJECT TEAM MEMBER OR TECHNICAL ENGINEER**

Core: *Foundations of Aerospace at NASA*
- Obtain mentor
- Join professional associations

**LEARNING STRATEGIES**
- Knowledge sharing forums
- Developmental assignments
- Performance enhancement for teams
- Non-traditional and hands-on learning experiences
- APPEL core curriculum
Guiding Principles:

1. Competency-based.

2. Focuses on building NASA-specific expertise and capability in project management and systems engineering and makes extensive use of NASA case studies.

3. Intended to supplement an individual’s academic and professional work experience.

**Foundations of Aerospace at NASA**

*Learning objective:* to give participants a solid understanding of the NASA organization and its principles of technical excellence.

**Project Management & Sys. Engineering**

*Learning objective:* to enhance proficiency in applying project management (PM) and systems engineering (SE) processes and practices over the project life cycle.

**Advanced PM & Advanced SE**

*Learning objective:* to give experienced practitioners a deep understanding of the challenges of leading and managing programs and projects in a complex and dynamic environment.

**Executive Program**

*Learning objective:* to develop a cadre of highly qualified NASA leaders for executive leadership roles. Participants selected based on recommendations of Center Directors and Associate Administrators.

✓ PMI Registered Provider of Professional Development Units
In-Depth Courses

Guiding Principles:
1. Designed to meet needs of Mission Directorates and centers
2. Emphasis on NASA specific case studies
3. Address OMB/GAO requirements

**Project Management**
- Integrating Cost & Schedule
- Understanding Proj. Scheduling
- Beyond Scheduling Basics
- Assessing Project Performance
- NASA’s Budgeting Process
- Performance-Based Statement of Work
- Project Mgmt Leadership Lab
- Management of Space Technology Programs
- Proj Planning Analysis & Control
- Scheduling & Cost Control
- Understanding EVM
- EVM Overview
- Beyond EVM Basics
- Advanced EVM
- International Project Mgmt
- Leading Complex Projects
- Integrating EVM with Acquisition

**Systems Engineering**
- Concept Exploration & System Architecting
- Decision Analysis
- Developing & Implementing a SEMP
- Fundamentals of Systems Engineering
- Space Systems V&V
- Transition, Product Delivery & Mission Operations

**Project Management & Systems Engineering**
- Lifecycle, Processes, & Systems Engineering
- Project Review Processes & Strategies
- Requirements Dev & Mgmt (Individual) (Team)
- Risk Management
- Continuous Risk Management

**NASA Aerospace Topics**
- Introduction to Aeronautics
- Exploration Systems and Space Operations
- Mars Mission & System Design Lab
- Earth, Moon, and Mars
- Science Mission Systems Design & Operations
- Science Mission Systems Design & Ops Lab
- Space Launch & Transportation Systems
Training Utilization

Total Course Participation 2003-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Participants</th>
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<tbody>
<tr>
<td>2003</td>
<td>2268</td>
</tr>
<tr>
<td>2004</td>
<td>2554</td>
</tr>
<tr>
<td>2005</td>
<td>2477</td>
</tr>
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<td>2006</td>
<td>1583</td>
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<tr>
<td>2007</td>
<td>1416</td>
</tr>
<tr>
<td>2008</td>
<td>1675</td>
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Participation by Center

<table>
<thead>
<tr>
<th>Center</th>
<th>Total</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Ames Research Center</td>
<td>681</td>
<td>6%</td>
</tr>
<tr>
<td>Dryden Flight Research Center</td>
<td>483</td>
<td>4%</td>
</tr>
<tr>
<td>Glenn Research Center</td>
<td>991</td>
<td>8%</td>
</tr>
<tr>
<td>Goddard Space Flight Center</td>
<td>1375</td>
<td>11%</td>
</tr>
<tr>
<td>NASA HQ (and NSSC)</td>
<td>428</td>
<td>4%</td>
</tr>
<tr>
<td>Jet Propulsion Laboratory</td>
<td>749</td>
<td>6%</td>
</tr>
<tr>
<td>Johnson Space Center</td>
<td>1765</td>
<td>15%</td>
</tr>
<tr>
<td>Kennedy Space Center</td>
<td>1721</td>
<td>14%</td>
</tr>
<tr>
<td>Langley Research Center</td>
<td>1430</td>
<td>12%</td>
</tr>
<tr>
<td>Marshall Space Flight Center</td>
<td>1501</td>
<td>12%</td>
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<tr>
<td>Stennis Space Center</td>
<td>220</td>
<td>2%</td>
</tr>
<tr>
<td>Non-NASA Attendees</td>
<td>756</td>
<td>6%</td>
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<tr>
<td><strong>Total Participants</strong></td>
<td><strong>11973</strong></td>
<td><strong>100%</strong></td>
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Exceeded targets in courses related to GAO High Risk Area
- Earned Value Management (multiple offerings)
- Program Planning, Analysis, and Control
- Requirements Development and Management
- Lifecycle Processes & Systems Engineering
- Project Management for Contracting Officers
- Project Management & Systems Engineering
- Foundations of Aerospace at NASA

Targeted attendance: 939
Actual attendance: 1206
APPEL offers rapid deployment training at any point in the project life cycle through one-on-one assistance, coaching, mentoring, focused workshops, or large-group sessions in the following areas:

- Team and Leadership Development
- Requirements Development
- Planning and Scheduling
- Program Control Analysis
- Systems Integration Support
- Risk Management
- Software Management
- Technical Review Support

currently supporting over 100 NASA engineering and project teams

Tools and Methods:
- Baseline team and individual assessments
- Team workshops
- Expert practitioners for technical support
- Coaching and mentoring
- Follow-up team and individual assessments
# Team Development Utilization

**Services Delivered 2001 - June 2008:**

<table>
<thead>
<tr>
<th>Activity</th>
<th>NASA</th>
<th>GSFC</th>
<th>JPL</th>
<th>MSFC</th>
<th>KSC</th>
<th>JSC</th>
<th>ARC</th>
<th>LaRC</th>
<th>GRC</th>
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<tbody>
<tr>
<td>Teams Assessed</td>
<td>475</td>
<td>76</td>
<td>108</td>
<td>35</td>
<td>53</td>
<td>85</td>
<td>51</td>
<td>12</td>
<td>21</td>
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<tr>
<td>Individuals Assessed</td>
<td>1,983</td>
<td>290</td>
<td>273</td>
<td>504</td>
<td>136</td>
<td>165</td>
<td>241</td>
<td>135</td>
<td>136</td>
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<tr>
<td>Individuals Coached</td>
<td>1,279</td>
<td>194</td>
<td>177</td>
<td>359</td>
<td>87</td>
<td>96</td>
<td>161</td>
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<tr>
<td>Expert Practitioner Hours</td>
<td>6,693</td>
<td>1,243</td>
<td>580</td>
<td>1,307</td>
<td>82</td>
<td>843</td>
<td>1,233</td>
<td>1,243</td>
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<tr>
<td>Center Program Manager Hours</td>
<td>17,091</td>
<td>2,480</td>
<td>2,945</td>
<td>2,081</td>
<td>2,565</td>
<td>2,937</td>
<td>1,296</td>
<td>1,266</td>
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- Team development most requested APPEL service
- Largest share of APPEL resources
- Broadly used by wide spectrum of NASA program/project teams

### Annual Utilization Trend:

- **Team Assessments, Annual:** 63% Per year
- **Individual Assessments, Annual:** 48% Per year
- **Workshop Days, Annual:** 53% Per year
- **Coaching sessions, Annual:** 94% Per year
Organizational Learning: Knowledge Sharing

Objectives:

• Capture and transfer knowledge from seasoned program/project managers and engineers across the agency. (GAO)
• Build a learning community of reflective practitioners. (CAIB)
• Facilitate open communication and dialogue. (CAIB, GAO, Rogers Rept.)

Activities:

• Invitational knowledge sharing forums and workshops
  – 816 total participants 2003-2008
• ASK Magazine: 6,000 subscribers; avg. 1,500 daily website hits
• ASK the Academy e-newsletter: 1,000+ email subscribers
• PM Challenge: 1,200 total participants in 2009
• Case studies: 28 NASA cases sponsored/developed
• Partnerships and exchanges with external organizations
  – JAXA, PMI Global Corporate Council, CIA, DoE
Measuring APPEL’s Effectiveness

Accreditation
  Project Management Institute (PMI) Registered Provider and Corporate Council Membership

Assessment and Testing
  Workforce needs analysis
  Baseline and post-service results for teams and individuals
  Online knowledge measurement tools

Special Assignments by Senior Leadership
  Requests for papers, articles, and case studies on policies and lessons learned

Customer Feedback
  Utilization metrics and user surveys
  Demand for project team services
  Meetings with senior leaders at centers and Mission Directorates

External Validation
  Benchmarking with Aerospace Corp., Perot Systems, MIT, MOWG

Alignment with NASA strategy and OMB/GAO Requirements
  Meet or exceed external goals/benchmarks for project management development
Broad Impact with Constrained Resources

2008 Status

✓ 1,675 trained in courses
✓ 100+ teams supported
✓ 1,200 PM Challenge participants
✓ 495 invitational forum participants

Significant Accomplishments

✓ SELDP
✓ New Principal Investigator Forum in partnership with SMD
✓ Exceeded all targets for GAO High Risk Area improvements
✓ OMB PM certification

Budget FY 02-FY09

Risks

• New training to repurpose workforce for future challenges
• Changing workforce demographics
• Need for agency-wide systems engineering capability
• Increased external requirements to redirect funding
Challenges and Opportunities

• Helping agency fulfill OMB requirements for PM certification

• Repurposing NASA Workforce
  • Demographic shifts/retirements
  • Transition from Shuttle/Station to Constellation

• Building agency-wide systems engineering capability

• Meeting increasing demand for services with decreased resources

• Leveraging external partnerships (existing and new) to further agency goals

• Integrating knowledge sharing activities as critical after-action functions to further progress as a learning organization