In the Driver's Seat: Program, Planning, and Control (PP&C)

Effective program, planning and control (PP&C) puts management in the driver's seat to successfully manage NASA's missions. Having the right type and level of programmatic information is essential to sound decision making. In an environment of constrained budgets, it is imperative to have accurate data and a skilled workforce without adding undue process and reporting requirements. Across the Agency, there has been a concerted effort to rebuild and improve NASA's PP&C capability. This PM Challenge session will share innovative PP&C techniques from both an institutional and a program perspective. A panel Q&A session will follow a brief overview of inventive practices that have been put in place at GSFC and within the Multi-Purpose Crew Vehicle Program.

Sandra Smalley  
Lucy Kranz  
Stephen Shinn
Ask Questions, Find Help

NASA Virtual Project Management Challenge

Applications
- Twin Otter
- X-43A (Hyper-X)
- Sub-scale Transport Aircraft
- ARES I-X Launch Vehicle
- X-29A
- Tu-144LL Supersonic Transport
- 1903 Wright Flyer Replica
- Global Hawk

There are many others ...

Tour the Player (Virtual PM Challenge)

Info

Chapters

Virtual PM Challenge

Links - link to related reference materials

Share presentation - email a presentation link bookmarked to play from a specific point

Polls

Ask a question
In the Driver's Seat: Program Planning and Control

Steve Shinn
Deputy Director of the Flight Projects Directorate for Planning & Business Management

July 10, 2013
IN THE DRIVER’S SEAT: PROGRAM PLANNING AND CONTROL

BUSINESS CHANGE INITIATIVE IMPROVING GODDARD SPACE FLIGHT CENTER’S PP&C ENVIRONMENT

In late 2011, Goddard Space Flight Center’s (GSFC) Flight Projects Directorate (FPD) created the Business Change Initiative (BCI) to examine the use of best practices, evaluate information sharing mechanisms, and identify suggested changes across the Directorate to improve cost, schedule, and technical performance.

Multiple teams are working to increase best practice sharing and deploying across programs/projects in PP&C methods, tools, processes, and knowledge to support improved performance and management decision making.
In the Driver’s Seat: Program Planning and Control

GSFC FPD PP&C Responsibilities

- Project Staffing & Training
- Contracted Instrument & Mission Management
- In-House Instrument & Mission Management
- Facilitation and Integration of External Stakeholders
- Facilitation and Integration of Institutional Support
- Project Cross Fertilization of Best Practices & Issues
- Project/Program Management Tools and Processes
- Guidance & Oversight
- BCI Focus Area

- Workforce Management
- Tools and Guidance
- Representation and Interaction with Stakeholders
IN THE DRIVER’S SEAT: PROGRAM PLANNING AND CONTROL

GSFC PP&C ENVIRONMENT

Current State

A disparate community with pockets of PP&C expertise, which is not well known, and where programs/projects often create their own unique solutions to solve problems

Future State

An integrated community to educate, openly share, and instill best practices across the organization and within programs/projects

Our vision is increased collaboration with programs/projects consistently applying best practices and actions to foster cost-effective and on-time delivery for all missions
**IN THE DRIVER’S SEAT: PROGRAM PLANNING AND CONTROL**

**BCI – RESPONSE TO CHALLENGES**

**Environmental Challenges**

- Rising costs, schedule delays, and disparate processes
- Increasing budget constraints; perceptions of NASA and Center challenges
- Possible retirement wave impacting knowledge capture and practices; need to ensure optimally-trained staff and sharing of best PP&C practices
- Increasing external reviews and data requests

**Our Response – BCI**

Comprehensive evaluation of best practices and management, communication and information sharing mechanisms intended to improve cost, schedule and overall performance across programs and projects

**Outcomes**

- Improved knowledge base and sharing
- Increased use of best practices
- Reduced duplicative workflows
- Improved decision making
- More commonality in approaches and tools
- Optimized resources
- Improved project performance
In the Driver’s Seat: Program Planning and Control

BCI – Framework

Action Teams support the development and assessment of different disciplines, program/projects, and activities in order to integrate efforts, institutionalize best practices, and enhance PP&C.

- **Initial five Action Teams focus on tangible actions** to improve our effectiveness in sharing knowledge and best practices.
- Progressing through five phases that guide changes from vision and definition through deployment.
- Researching, surveying, and recommending best practices for streamlined project activities.
- Creating guidance, templates, standards, tools, and training for FPD and the Center.
- Implementing changes in core disciplines and adjusting as needed based on feedback and pilot implementations.

As the BCI progresses and additional opportunities for improvement are identified, additional focus teams may be formed. Currently, the BCI is initiating three new teams for Web Architecture, Configuration Management, and Project Management Tools.
IN THE DRIVER’S SEAT: PROGRAM PLANNING AND CONTROL

COLLABORATIVE PARTNERSHIPS – ESSENTIAL TO SUCCESS

Collaborated with GSFC Office of the Chief Financial Officer to create business training guidance and curriculum(s); coordinated on Center-wide Earned Value Management (EVM) needs and approach.

Partnered with NASA Headquarters (HQ) Office of the Chief Engineer (OCE) on Agency-wide EVM guidance; solicited input to improve Center’s management reporting process and to expand various training curriculums and extend availability to the programs/projects.

Collectively worked with GSFC Engineering and Human Capital Directorates to expand information repository for early-career professionals.

Collaborated with NASA HQ Cost Analysis Division (CAD) and other NASA Centers for JCL and cost estimating training.

Worked with the Applied Physics Laboratory (APL) and Jet Propulsion Laboratory (JPL) to collect lessons learned and identify Schedule BPIs, EVM requirements, and practical aspects of the Joint Confidence Level (JCL) Process across organizations.

Note: These are examples of partnerships and not an exhaustive list.
IN THE DRIVER’S SEAT: PROGRAM PLANNING AND CONTROL

PP&C CHANGE INITIATIVES FRAMEWORK

Established

Agency Policy, Procedural Requirements
NPR 7120.5, NASA Program and Project Management Processes and Requirements

Center Policy, Procedural Requirements
GPR 7120.7, Schedule Margins and Budget Reserves

Principles and Best Practices
- Project Artifacts, Methods, Techniques
- Handbooks (GAO, DCMA, NDIA, NASA)

Tools and Resources
- Commercial of the Shelf (COTS)
- Agency, Center Enterprise Licenses

BCI in Development

- NASA Agency EVM Handbook (providing feedback and support)
- GSFC/FPD Schedule Management Requirements Procedural Guidelines (PG)
- GSFC EVM PG
- Schedule Best Practice Instructions (BPI)
- GSFC Joint Confidence Level Handbook
- GSFC EVM Enterprise License Upgrade
- Scheduling Knowledge Network (SharePoint Portal)
- Goddard Schedule Analysis Tool (GSAT)

All BCI implementations follow a similar approach to identify guidance gaps and leverage existing policies and practices.

Blue italics are still in the Define/Develop Stage(s)
In the Driver’s Seat: Program Planning and Control

BCI – Scalability for Project Assistance & Compliance, Incremental Approach to Ensure Lasting Change

Program/Project Lifecycle
Survey and assess complete FPD program/project portfolio to understand similarities and differences

Applicability
Identify valid needs for each grouping of “like” programs/projects to balance conditions for feasibility and adoption

Compliance
Provide tools, templates, guidance, and resources to facilitate fulfillment of requirements for all applicable groups

Prior to deployment, each change is developed with consideration of the effect on and significance to the GSFC project portfolio.

In many cases, various projects will be piloted to measure ability to adopt new practices, and tools and resources are developed from the feedback received to assist in acceptance
IN THE DRIVER’S SEAT: PROGRAM PLANNING AND CONTROL

BCI: MONTHLY STATUS REVIEW (MSR) REPORTING

Objective: Improve insight into projects performance, communication of status, and early warning of potential issues for enhanced decision making

New MSR Guidance – Modifications were made to streamline the reporting process from project reviews to the Directorate to the Center to the Agency. The result was improved clarity and traceability to program/project status

| [Executive] Established consistency; standardized Summary Quad and Project Fever Summary charts | [Cost and Schedule] Furthered visibility; created Business Assessment Dashboard and Schedule Assessment (fever-style) |
| [Issues, Risks, and Alerts] Improved traceability; directed use of inputs from the Center Top 10 Issues and Risks database | [Other & Backup] Increased awareness; mandated inclusion of accomplishments and upcoming education/outreach |

Thirty-one BPIs were developed based on GSFC successes, as well as practices identified from other Centers, industry and other agencies.

The network is a SharePoint portal that houses the 31 BPIs and PG, as well as links to helpful aids, tools, templates, and resources.
**Objective:** To expand knowledge sharing across projects and increase consistency in use of practices in developing quality IMS

- Aids in evaluating project’s IMS and associated schedule management processes
- Leverages the cadre of experts around Center for support/skills
- Supports interaction and exchange of tips and lessons
- Serves as a quality assurance review
- Employed to maintain standards of quality, improve performance, and provide credibility in terms of the IMS
IN THE DRIVER’S SEAT: PROGRAM PLANNING AND CONTROL

BCI: EVM Focus

Objective: Increase EVM use and consistency for better tracking through improvements in various elements (tools, process, policy, training, and reporting)

**Policy**
- Provide Center response to NASA HQ requirements
- Prepare internal guidance for projects to navigate policy and approach

**Compliance**
- Integrated Baseline Reviews/Surveillance Reviews
- Key Decision Point reviews
- Contractor reviews

**Tools**
- Tool training development and implementation
- Generate and install hardware and software requirements

**Reporting**
- Improve published reporting requirements
- Update MSR
- Create reporting users guide

**Training**
- Identify available training
- Identify training needs of workforce
- Tailor EVM training to projects life cycle and workforce

Earned Value Management System
In the Driver’s Seat: Program Planning and Control

EVM Example: Training Landscape Evaluated and Expanded

Objective: Design EVM training that supports the skills needed by project teams and identify the tool-based and analytical EVM learning that project teams and stakeholders require.

Other Artifacts Include:
- Course listings by project milestones
- Training concept document designs

EVM Skill Inventory

EVM Skill Analysis: Requirement by Major Milestone

- Curriculum design framework
- Skill requirement identification and assessment questions
In the Driver’s Seat: Program Planning and Control

BCI: Knowledge Management and Skill Development

Objective: Develop and enhance career development and informational tools to better align skills & resources and increase PP&C knowledge sharing

- **B**usiness focuses on all PP&C and business functions that affect projects
- **R**apid pursues 5-10 actions per year based on priority needs and quick results
- **I**nformation focuses on improvements to information access or communications
- **S**kills supports career development efforts (e.g., training, career pathways)
- **K**nowledge improves repositories and facilitates using true Knowledge Management techniques

**BRISK** is collaborating with many business training and learning organizations to improve and leverage efforts to provide optimal learning for the BCI.
IN THE DRIVER’S SEAT: PROGRAM PLANNING AND CONTROL

BCI PHASE I ACCOMPLISHMENTS

**SCHEDULING**
- Developed and deployed a Schedule Management PG
- Identified and created 30+ planning and scheduling BPIs
- Built a Planning and Scheduling Knowledge Network (SharePoint)
- Coordinated collection for development of a project portfolio IMS

**MANAGEMENT REPORTING**
- Revised the Directorate-level and Center-level MSR guidance
- Streamlined the collection and reporting of the Center’s Top 10 Issues report for programs and projects

**EVM**
- Assessed and defined the As-Is Goddard EVM System Architecture
- Designed an EVM Training Curriculum Concept Document
- Coordinated and distributed EVM templates for project performance reporting
- Streamlined the acquisition process for GSFC-wide EVM software

**COST ESTIMATING**
- Employed a reliable framework for conducting JCL model assessments at Goddard, operating consistently over the past 12 months
- Wrote and released a JCL Handbook for Goddard

**BRISK**
- Re-constituted a Combined Resources Forum to share learning, knowledge among community
- Designed curriculum and helped train ICESat-2 to assist in successful execution of EVM
- Organized and updated the GSFC’s Professional Intern Program (PIP) Repository
- Extended training on Budget Execution, Planning and Scheduling for Resources Analysts, and Product Development Lead Training
**IN THE DRIVER’S SEAT: PROGRAM PLANNING AND CONTROL**

**BCI LESSONS AND NEXT STEPS**

- Form cross-functional teams with subject matter experts
- Identify specific challenges, drivers
- Compile research and benchmark studies
- Identify overall areas for improvement

- Interview mix of targeted programs/projects in various phases
- Perform stakeholder analyses
- Conduct surveys and organize focus groups
- Review external sources for other best practices
- Assess and prioritize best practices

- Create detailed implementation plans
- Plan for and ensure early wins
- Design communication material
- Define performance measures

- Build and design a collaborative web platform (i.e., SharePoint)
- Create handbooks, templates, guidance, requirements, tools
- Formulate project-specific training

- Release progress communications
- Execute changes for each action team
- Build upon successes and make implementations additive
- Foster an environment for new approaches and best practices

Moving forward, FPD is continuing in the identification and deployment of changes to our PP&C methods and tools, collaborating with others and adjusting as appropriate. Ongoing efforts include:

- Continuing to roll out changes across the five action teams; completed Phase I in June and moving forward with Phases II and III
- Soliciting feedback and adjusting changes as needed
- Creating an environment to enable adoption of new approaches yet ensuring these approaches are anchored in our business and support sharing across programs/projects
- Collaborating to identify additional best practices and improvements
It must be remembered that there is nothing more difficult to plan, more doubtful of success, nor more dangerous to manage, than the creation of a new system.

For the initiator has the enmity of all who would profit by the preservation of the old institutions and merely lukewarm defenders in those who would gain by the new ones.
Lucy V. Kranz, Manager
Orion Program Planning & Control
July 10, 2013
<table>
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<tr>
<th>Program Manager</th>
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<tr>
<td><strong>Concept Studies</strong></td>
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<td>• Initiate, support and conduct program-level concept studies consistent with direction and guidance from MDAA</td>
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<td><strong>Budget and Resource Management</strong></td>
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<td>• Implement program consistent with budget</td>
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<td>• Develop cost estimates for components</td>
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<td>• Develop workforce and facility plans</td>
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<td>• Manage program resources</td>
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<td>• Provide annual program budget submission input</td>
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<td>• Support development of the Agency Baseline Commitment (ABC)</td>
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<td><strong>Program Plans</strong></td>
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<td>• Develop and approve program plan</td>
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<td>• Execute program plan</td>
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<td><strong>Performance Management</strong></td>
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<td>• Assess program technical, schedule and cost performance and mitigate risks</td>
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<td>• Provide data to support the monthly BPR process and report on performance</td>
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<td>• Communicate program performance, issues and risks to Center and Mission Directorate management and present recovery plans</td>
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<td><strong>Life Cycle Reviews</strong></td>
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<td>• Prepare for and provide assessment of program and readiness to enter Implementation</td>
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‘Traditional’ PP&C is a Flat Organization of the Disciplines Performing the Work each with its own unique tool set.

- Strategic Assessment
- Cost Estimating w/ JCL
- Budget and Financial Management
- Resource Management
- Schedule Management
- Technology Protection
- Configuration Management
- Supplier Management
- Facilities Management w/ Security
- Risk Management w/ QA
- Information Technology
- EVM
- Data Management
- Procurement
- LVK: PM Challenge 2013, July 10, 2013

Approved for Public Release
Traditional PP&C Approach was not Meeting Orion Project Needs

FY2009: What is our status? Where are we headed? Will we meet our commitments? (1)

FY2010: • Constellation Program Cancelled
  • HQ-directed budget cuts
  • Budget for Orion PP&C work cut 30%

FY2011: • Orion Project becomes Orion - MPCV Program
  • Program funded at ~70% Orion Project value
  • NASA Administrator commits to affordability (2)
  • PP&C budget cut an additional 20%
  • Took on cross-program integration

(1) Statement made by the Orion Project Manager following a two-day management review consisting mostly of activity reports and data dumps

(2) Statement of the Honorable Charles F. Bolden Jr. Administrator NASA before the Committee on Science, Space and Technology, U S House of Representatives, July 12, 2011
Orion PP&C re-engineered its approach to enable performance management.

FY2010:
- Studied PP&C to determine how to improve performance and to operate at a reduced level of funding
- *Shifted from a service-based function providing data reports to a product-based analytical function providing information*
- Termed the shift “Next Generation”

FY2011:
- Re-organized Orion PP&C to implement Next Generation PP&C system

FY2012:
- Re-competed the Orion integration contract to implement Next Generation PP&C approach

FY2013:
- Awarded a new contract
  - 15% cost reduction with 1.5% to 3% annual cost avoidance
  - Process Improvement and Affordability Panel
The Lessons Learned are Fundamental Principles for Orion Program Performance Management

- The work performed is not the same as the disciplines/tools used to perform the work
- Data reports do not provide actionable information; the recipient must ‘connect the dots’

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- PP&C work is a cycle of interacting, interrelated and interdependent functions; i.e., a system

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<th>Chart 7</th>
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- There are only three independent variables: cost, schedule and technical
- The relationship between the three variables is planned by management and not mathematical
- The environment where management occurs can be represented as a ‘trade space’

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<th>BU Chart 1</th>
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- A Program Manager manages the three variables in accordance with the Program and Execution Plans to achieve the required outcome

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<th>BU Chart 2</th>
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- EVM is a performance measure that is input to Performance Management

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- Definition and documentation are fundamental to communication and understanding

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PP&C Work uses Disciplines and Tools to Provide Actionable Information

- The work performed is not the same as the disciplines/tools used to perform the work
- Data reports do not provide actionable information; the recipient must ‘connect the dots’

**Work**
- Document Baseline
- Plan Work
- Acquire Resources
- Manage & Control Data
- Manage & Control Change
- Manage Performance
- Report Performance

**Variables**
- Cost
- Schedule
- Technical

**Discipline/Tools**
- Budget Processes
- Configuration/Data Management
- Cost Estimating
- Integrated Master Schedule
- Earned Value Management
- Financial Management
- Information Technology
- Joint Confidence Level
- Procurement
- Risk and Quality Management

**Insight:**
- Work ≠ Tools
- Report ≠ Analysis

**Information**

**Integrated Analysis**

**Decision-Making**

**Data Reports**

**Measurements**

**DDT&E**
• PP&C work is a cycle of interacting, interrelated and interdependent functions; i.e., a system
Near Real-Time Performance Management is Performed Weekly, Monthly, Quarterly and Annually

Planning Data
- Program Baseline
- Baseline Attributes
- Strategic Assessments
- Cost Estimates

Supplier Data
- Supplier DRDs
- Data Mining

Performance Management
- Current Performance
- Integrated Analysis
- Independent Assessments
- Performance Threats

Orion Management Forums
- Weekly
  - OPSR
- Monthly
  - MOPPR
- Quarterly
  - QPPR
- Annual
  - PPBE

Knowledge (for KDP)
# Program Planning and Control (PP&C) Agency Working Group

## PP&C Working Group Primary Members

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## PP&C Steering Committee

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## PP&C Working Group Alternate Members

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## PP&C Contributing Members

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Virtual PM Challenge, Session #3

In the Driver’s Seat: Program Planning and Control

QUESTIONS?
Upcoming Webcast

Title: Master’s Forum
Date: August 7, 2013

Check PM Challenge website for latest information
There are only three independent variables: cost, schedule and technical
The relationship between the three variables is planned by management and not mathematical
The environment where management occurs can be represented as a ‘Trade Space’

Planning Products
- Program Baseline
- Strategic Assessments
- Baseline Attributes
  - Program Plan
  - Execution Plan
  - Master Schedule
  - CAM Schedules
  - Product schedules
  - Analysis schedules
  - Milestones & Events
  - Risk
  - Assumptions
- Contractor Baseline
- Cost Estimates
- Controlled Documents
The Program Manager manages the three variables in accordance with the Program and Execution Plans to achieve the required outcome.

**Integrated Analysis**
- Forecasts
- Independent Assessments
- Near-Term Threats
  - Budget/Cost
  - Schedule
  - Technical Capability
- Long-Term Implications
  - Program Baseline

**Performance Measures**
- Current Performance
  - Cost Variance
  - Workforce Variance
  - Schedule Variance
  - EVM
  - Assumptions Validity
  - Risk
  - Quality Audit Reports
EVM is one of Many Performance Measures for Orion Performance Management

- EVM is a performance measure that is input to Performance Management

White Paper: Orion MPCV Performance Management

The Orion MPCV Program will report EVM at the Program level. The Agency Baseline Commitment includes the Performance Measurement Baseline for EVM computations for both Prime and Non-Prime content.

Agency Baseline Commitment

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Performance Management

- Performance Measures
  - Cost Variance
  - Workforce Variance
  - Schedule Variance
  - EVM
    - Assumptions Validity
    - Risk
    - Quality Audit Reports

- Integrated Analysis
  - Near-Term Threats
  - Long-Term Implications
Orion-MPCV Program Has Fully Documented Its Approach to PP&C

- Definition and documentation are fundamental to communication and understanding

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* Handouts