NASA PLAN FOR IMPROVEMENT

IN THE

GAO HIGH-RISK AREA

OF

CONTRACT MANAGEMENT

October 31, 2007

Updated through January 31, 2008

High Risk Area: NASA Contract Management

Planning Document

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Reference GAO Report:	GAO-07-310, High-Risk Series: An Update, January 2007, http://www.gao.gov/new.items/d07310.pdf

Scope
This Corrective Action Plan, hereinafter referred to as the "Plan," encompasses NASA's policies and processes concerning program/project management and related surveillance of contractors through appropriate insight and oversight, including cost estimating, cost reporting, and life-cycle cost performance management tools such as earned value management.

Overall Approach
Develop an Agency-wide coordinated approach to improve NASA's program/project management, particularly on how best to assure the mitigation of potential issues in acquisition decisions and better monitor contractor performance, including--

- Life-cycle cost management estimating and analysis;
- Business processes for obtaining, recording, and analyzing contractor cost and performance data; and
- Internal assessment processes that analyze the root causal factors for performance issues.

Process

NASA will--

1. Formulate initiatives and goals that address each of five identified focus areas (see Tables 1 and 2);
2. Identify milestones for meeting goals for the initiatives;
3. Integrate the activities of the initiatives, managing their interdependencies, and ensuring synergy of these complementary efforts;
4. Develop metrics that will be used to measure improved performance;
5. Secure concurrence from OMB and GAO on goals, milestones, and metrics; and
6. Monitor progress through frequent intra-Agency communication (including quarterly update reports to the Agency-level POC, quarterly integrated team meetings with quarterly updates to senior management, and quarterly updates through the internal control system), coordination with GAO twice a year, and periodic briefings, pursuant to the OMB update briefing schedule.

Responsible Organizations

The Deputy Administrator is ultimately responsible for the development and successful execution of this Plan. On behalf of the Deputy Administrator, the Director of the Office of Program and Institutional Integration (OPII) is the assigned Agency-level lead executive responsible for overseeing the initiatives cited in this Plan and for ensuring cross-organizational integration. Each of the seven initiatives comprising this Plan identifies a senior-level executive who is individually responsible for implementing that initiative, including the required periodic reporting, measurements, and metrics. Many of the initiatives also identify supporting organizations which will participate in the necessary cross-functional activities encompassed in the initiatives. For Initiative C, the Director of OPII is identified as the Sponsoring Executive for this complex initiative; OPII will play an active advocate role in terms of obtaining and maintaining broad executive-level support and ensuring balanced resolution of any conflicts. These seven initiatives describe transformational activities that will become part of the way the Agency does business. Thus, implementation will be Agency-wide, involving the integration of efforts of Mission Directorates, Mission Support Offices, and Centers. The NASA Integrated Enterprise Management Program (IEMP), within the Office of the NASA Chief Information Officer, will provide Agency-wide business system support to implement these initiatives.

Goal

NASA's goal under this Plan is to improve the effectiveness of its program/project management across the board, including monitoring and analyzing contractor performance; life-cycle cost/schedule management practices; cost estimating practices; and associated business processes.

Metrics

An initial set of metrics has been identified to track results that indicate the impact of the initiatives encompassed in this Plan. Those metrics are set forth within each initiative (the Appendices to this Plan). NASA will update the initial set of metrics periodically, as appropriate, commensurate with progress made within each initiative. The initial set of metrics incorporates both output and outcome metrics, including integrative metrics, in

light of the cross-functional and interrelated nature of the identified focus areas and initiatives.

Initiatives

Details regarding each of the seven initiatives within this Plan are attached as appendices, including a description of the initiative, the focus area(s) to which it contributes, the lead executive, the supporting organization(s), expected outcomes, accomplishments, milestones, impediments and challenges, and initial metrics.

The subject initiatives address the focus areas, as shown in Table 2, and are logically interrelated as follows:

- Initiative A, Program/Project Requirements and Implementation Practices, addresses requirements and implementation practices of program/projects;
- Initiative B, Agency Strategic Acquisition Approach, heightens linkage between program/project planning and Agency strategic considerations;
- Initiative C, Contractor Cost Performance Monitoring, seeks to improve the availability of contractor data to support performance monitoring of programs/projects;
- Initiative D, Project Management Training and Development, improves training and development of program/project managers, particularly with regard to oversight;
- Initiative E, Improve Life-Cycle Cost/Schedule Management Processes, targets cost estimating processes used to establish baselines against which program/project performance is measured and strengthens program/project management and oversight processes and reporting;
- Initiative F, IEMP Process Improvement, seeks to improve the way business systems work together, so that program/project management and oversight tools can be optimized; and
- Initiative G, Procurement Processes and Policies, strengthens policy in areas relevant to procurement processes.

Thus, the initiatives will synergistically advance the effectiveness of NASA's program/project management, pursuant to the overall goal of this Plan, to the extent possible. As is described in this Plan, NASA intends to take responsible actions to improve its program/project management and to minimize cost/schedule growth. Given the nature of the Agency's mission, however, it is not reasonable to expect that cost/schedule growth can be entirely controlled. NASA conducts one-of-a-kind, technically advanced, complex, multiyear, inherently high-risk programs and projects. Performing this work within the Federal environment of budget uncertainties and funding disruptions (such as Continuing Resolutions) greatly increases the level of difficulty for Agency program/project management. This situation must be acknowledged and considered in gauging the effectiveness of NASA's program and project management.

Methodology for Evaluation
As was noted above, each initiative identifies the Agency senior-level lead executive who is responsible for achieving the identified goals through successful completion of the milestones and accomplishment of the metrics. Each such point of contact will track progress of the initiative and will provide status reports and information to OPII at least quarterly, and more frequently upon request. Supporting organizations have also been identified where applicable, and the managers of those organizations will work closely with the lead executive in completing the milestones. Each assigned lead executive will expeditiously report any issues or changes to OPII. The initiative leads and supporting organizations form a High-Risk Team. OPII will sponsor Team meetings quarterly, and more frequently as necessary, to discuss progress and ensure appropriate integration. OPII will be responsible for informing the Deputy Administrator of progress, as well as issues, on a regular basis, not less frequently than quarterly.

Remarks: January 31, 2008
In this document, the baseline CAP (dated October 31, 2007) is updated to reflect the status of NASA's High-Risk initiatives through the CAP's first quarter (which ended January 31, 2008), in preparation for the OMB-GAO-NASA High Risk Status meeting scheduled for March 26, 2008.

This update's actions/targets track to the proposed actions/targets listed in the October 2007 CAP. Completed corrective actions clearly indicate completion dates. Schedule slippage is indicated and explained.

There are no changes to the originally-identified responsible individuals and their point of contact information at this time.

During the past year, NASA has made significant progress in addressing the long-standing GAO High-Risk Area of NASA Contract Management. The following comments are provided at a summary level to assist OMB in completing a NASA-GAO-OMB High Risk Scorecard assessing NASA's corrective action plan implementation during the period of November 2007 through January 2008.

> **Leadership Commitment:** ***Satisfactorily Addressed.***
> NASA's Corrective Action Plan was approved and issued by the Agency's Deputy Administrator, Shana Dale. During this first quarter of implementation, NASA leadership has actively demonstrated its commitment and support for this effort. Most recently, the High-Risk CAP was the topic of the January 29, 2008, session of the Mission Support Implementation Weekly (MSIW) meeting, chaired by the Deputy Administrator. The MSIW presents an opportunity for senior-level NASA managers to come together and discuss strategic issues. Following this session, The Deputy Administrator posted an entry on her InsideNASA blog (http://wiki.nasa.gov/cm/blog/Shana's-Blog) explaining the High-Risk strategy and stating her commitment to resolve the High-Risk issues.

Capacity: ***Satisfactorily Addressed***
Since finalization of the Corrective Action Plan, numerous cross-Agency teams and sub-teams have been formed and are actively involved in the CAP activities. Although resources are tight across the Agency, the high priority of this effort is well-recognized. CAP efforts have benefited from senior managers' commitment and support. Mission Directorate and Center managers have been responsive to calls for program/project office involvement.

Corrective Action Plan Quality: ***Satisfactorily Addressed***
This element was achieved through issuance of NASA's CAP on October 31, 2007. The CAP clearly identifies the areas in need of corrective action and outlines initiatives to address these areas. GAO has noted that the CAP "…targets problems and issues that our reports have found are contributing to high risk in contract management." The high quality of the initial CAP will be sustained through issuance of clear and informative updates, such as this document.

Validation: ***Satisfactorily Addressed***
The first-quarter accomplishments identified in this update document are each concretely verifiable. The responsible NASA organizations are retaining the associated records, and have provided update documentation to the OPII integrator of this effort. The combination of cross-functional team approaches, accountable lead executives, integration across the initiatives, and senior management attention serve to ensure the relevance and value of CAP actions.

Demonstrated Progress: ***Satisfactorily Addressed***
Milestone status is provided in this update document. NASA has met many of its first-quarter milestones. For each of those milestones that were not met, an explanation is provided herein and a plan is in place to address the issues that precluded timely accomplishment of the milestone.

NASA is committed to making necessary improvements in the area of Contract Management through implementation of this Plan. This document demonstrates that the agency's focused and purposeful CAP activities are already well underway.

FOCUS AREAS (Derived Requirements)

1. PROGRAM/PROJECT MANAGEMENT

1.1. NASA shall perform effective program/project management and contractor oversight.
1.2. NASA shall emphasize product performance, cost controls, and program outcomes.
1.3. NASA systems for contractor cost reporting shall provide the program/project community the information needed to monitor contractor performance.
1.4. NASA systems for contractor cost reporting shall provide the program/project community with cost information that enables them to compare budgeted and actual cost for the work performed on the contract.
1.5. NASA systems for contractor cost reporting shall provide the data, tools, and analytical skills needed to alert program/project managers of potential cost overruns and schedule delays and take corrective action before discrepancies occur.

2. COST REPORTING PROCESS

2.1. NASA shall re-engineer contractor cost reporting processes.
2.2. The NASA financial management system shall provide accurate and reliable information on contract spending.
2.3. NASA shall obtain from its contractors the financial data and performance information needed to assess progress on its contracts. NASA systems for contractor cost reporting shall provide cost information that program/project managers and cost estimators need in order to develop credible estimates and compare budgeted and actual cost with the work performed on the contract.

3. COST ESTIMATING AND ANALYSIS

3.1. NASA shall instill a disciplined cost-estimating process in project development efforts.
3.2. NASA's system for contractor cost reporting shall provide such information to cost estimators that will enable them to compare budgeted and actual cost with the work performed on the contract.
3.3. NASA's system for contractor cost reporting shall provide such information to cost estimators that will enable them to develop credible estimates.
3.4. NASA shall provide its staff with the full complement of analytical tools needed to perform life-cycle cost performance analyses, including earned value management.
3.5. NASA shall train its staff to perform cost analyses, including earned value management.

4. STANDARD BUSINESS PROCESSES

NASA shall define its standard business processes, which may include re-engineering existing processes.

5. MANAGEMENT OF FINANCIAL MANAGEMENT SYSTEM

5.1. NASA shall develop a concept of operations for its financial management system.
5.2. NASA shall implement the disciplined processes necessary to manage its financial management system project.

Table 1: Focus Areas

INITIATIVES ASSOCIATED WITH FOCUS AREAS						
INITIATIVE	***Lead Executive***	**1. Program/ Project Management**	**2. Cost Reporting Process**	**3. Cost Estimating And Analysis**	**4. Standard Business Processes**	**5. Management Of Financial Management System**
A. Program/Project Requirements and Implementation Practices	*Chief Engineer*	X		X	X	
B. Agency Strategic Acquisition Approach	*Director, OPII*	X			X	
C. Contractor Cost Performance Monitoring	*Chief Engineer*	X	X	X	X	
D. Project Management Training and Development	*Chief Engineer*	X	X	X	X	
E. Improve Life-Cycle Cost/Schedule Management Processes	*Associate Administrator for Program Analysis and Evaluation*	X	X	X	X	
F. IEMP Process Improvement	*Chief Information Officer*	X			X	X
G. Procurement Processes and Policies	*Assistant Administrator for Procurement*				X	

Table 2: Initiatives Associated with Focus Areas

Appendices

INITIATIVES

A. Program/Project Requirements and Implementation Practices
   A1. Revise and Implement Program/Project Management Requirements
   A2. Improve Management Oversight of Project Cost, Schedule, and Technical Performance--State of the Agency Reporting

B. Agency Strategic Acquisition Approach

C. Contractor Cost Performance Monitoring

D. Project Management Training and Development

E. Improve Life-Cycle Cost/Schedule Management Processes
   E1. Cost Estimation
   E2. Data Collection: Reporting CADRe
   E3. Cost/Schedule Performance Assessments and Reporting

F. IEMP Process Improvement
   F1. Business Concept of Operations (ConOps)
   F2. Business System Gap Analysis

G. Procurement Processes and Policies

Appendix A

PROGRAM/PROJECT REQUIREMENTS AND IMPLEMENTATION PRACTICES

Focus Areas: Program/Project Management, Cost Estimating and Analysis, and Standard Business Processes.

Lead Executive: Michael G. Ryschkewitsch, Chief Engineer

Supporting Organization(s): all Mission Directorates, Mission Support Offices, and Centers

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INITIATIVE A1: Revise and Implement Program/Project Management Requirements

Description
This initiative addresses the ongoing reassessment and revision of Program/Project Management requirements for Space Flight Programs/Projects, Institutional Infrastructure and Information Technology Programs/Projects, and Research and Technology Development. This effort will better define the management review and approval process for establishing cost, schedule, and technical baselines. It is directly related to the implementation of the Agency's governance model, established by the NASA Administrator in 2005. The new governance model required reorganization of both Headquarters and Center reporting relationships and functions, as described below.

In the NASA governance model, Mission Directorates have programmatic authority, and Centers have technical authority. Figure I-1 (below) from NASA Policy Directive (NPD) 1000.0, Strategic Management and Governance Handbook, August 2005, identifies the three management councils that were established to oversee and coordinate Agency planning and operations. This NPD has two primary aims:

(1) To set forth the principles by which NASA will strategically manage the Agency and describe the means for doing so; and

(2) To identify the specific requirements that drive NASA's strategic planning process, leading to products such as the Strategic Plan and the Annual Performance and Accountability Report.

The Strategic Management Council (SMC) is chaired by the Administrator and determines NASA's vision and strategic direction and assesses the Agency's progress. The Operations Management Council (OMC) is chaired by the Deputy Administrator and reviews and approves institutional plans. The Program Management Council (PMC) is chaired by the Associate Administrator and is responsible for reviewing program/project

formulation performance, recommending approval, and overseeing implementation of programs and Category 1 projects according to Agency commitments, priorities, and policies.

Figure I-1, NASA's new governance model is based on three management councils.

The Agency's mission is executed by four Mission Directorates--the Aeronautics Research Mission Directorate (ARMD), the Exploration Systems Mission Directorate (ESMD), the Science Mission Directorate (SMD), and the Space Operations Mission Directorate (SOMD).

To further the implementation of this new governance structure, revisions to program and project management requirements have been initiated in major policy documents. Those requirements will now focus on the three major management areas of the Agency's activity:

- NASA Procedural Requirements (NPR) 7120.5D, NASA Space Flight Program and Project Management Requirements
- NPR 7120.7, NASA Institutional Infrastructure and Information Technology Program and Project Management Requirements (still in Draft)
- NPR 7120.8, NASA Research and Technology Development Management Requirements (finalized in February 2008)

The revisions will provide a common process flow for all programs and projects. Although emphasizing commonality, they will be tailored appropriately to each of the three identified management areas and their respective program/project environments. They will establish a disciplined review structure for development, assessment, and control of technical requirements and implementation plans (including cost and schedule). As a baseline, there will be five key execution elements:

- Key Decision Points (KDP)
- Required independent reviews

    - Entry and success criteria identified
    - Standing Review Board provides input to PMC after each review
    - Independent Cost Estimate required
- Required life-cycle KDP gate products
    - Performance Measurement Baseline
    - Integrated Baseline Reviews
    - Life-Cycle Cost Estimate
    - NASA Federal Acquisition Regulation (FAR) Supplement establishes contractor requirements
- PMC and Center Management Council role in life-cycle process
- Decision authority role as gatekeeper

Implementation of the program/project management requirements is the responsibility of the Mission Directorates and Centers, subject to the applicable requirements document revisions. Summarized below are the key elements of the program and project management requirements:

- Control Practices
- Configuration and Control Process
- Training Program
- Waiver Process
- Management Practices
    - Initiation and approval of programs and projects
    - Planning, costing, scheduling, and controlling the integrated baseline
    - Earned Value Management
    - Management reporting
    - Dissenting opinions processes
    - Reviews and Key Decision Points
    - Technical Authority
- Engineering Practices
    - Design and build documentation
    - Risk management
    - Software management
    - Human factors, health, and safety
- Safety and Mission Assurance Practices
- Compliance Traceability

Thus, in consonance with associated Focus Areas, this initiative will improve program/project management, cost estimating and assessment, and standardization of business practices. It is most closely interrelated with Initiative B (since the new strategic acquisition meetings are included in this new regulation set); Initiative C (emphasizing data needs for cost monitoring); Initiative D (through which program/project managers are trained); Initiatives E1/E2 (improving cost estimates); and Initiative E3 (management oversight of performance).

Expected Outcomes

- Strengthening a standard of uniformity in NASA program/project management.
- Clarifying the flow down of programmatic and management process requirements.
- Clarifying accountability, including roles and responsibilities of key personnel.

Accomplishments

March 2007	Effective date of NPR 7120.5D, NASA Space Flight Program and Project Management Requirements
May-July 2007	Rollout of NPR 7120.5D policy to JSC, LaRC, and MSFC
September 2007	Rollout of NPR 7120.5D policy to ARC, DFRC, GRC, and JPL
September 2007	Issued Mission Directorate and Center NPR 7120.5D implementation evaluation criteria
January 2008	Rollout of NPR 7120.5D policy to HQ and three remaining NASA Centers – KSC, SSC, GSFC. This milestone was initially scheduled for completion in December 2007. The visit to the final Center, SSC, was delayed until early January, 2008, due to travel and scheduling complications.
February 2008	Issue NPR 7120.8, NASA Research and Technology Project Management Requirements. Update: This milestone was initially scheduled for completion in December 2007. Completion was delayed in December 2007 while going through the NASA policy document coordination process. An action was generated at that time and is now closed. The document was finalized in February 2008.

Actions Required to Complete

The Office of the Chief Engineer (OCE) will complete the preparation of program/project management policy requirements and assess Mission Directorate and Center implementation.

June 2008	Issue NPR 7120.7, NASA Institutional Infrastructure and Information Technology Program and Project Management Requirements. January 2008 Update: This milestone was initially scheduled for completion in March 2008. The document is currently undergoing internal coordination which will lead to senior management review. In light of issues that have arisen during the coordination process, the due date is extended to June 2008.
May 2008	Mission Directorate and Center visits and survey their implementation of NPR 7120.5D. Such surveys will be a future ongoing activity. January 2008 Update: This milestone was initially scheduled for completion in April 2008. Current plans are to survey the first Center in the April/May 2008 timeframe. The updated due date of May 2008 allows for the possibility of slight schedule slippage past April.

Impediments/Challenges

- Providing the needed training and education for institutional and project personnel. In this January 2008 update document, related training is addressed under Initiative D and is proceeding satisfactorily.
- Updating Center- and program-specific processes and practices to align with NPR 7120.5D revisions. Note for January 2008 update: insight into Center and program progress in this area will be obtained through the planned implementation surveys.

Metrics

At each initial Mission Directorate and Center visit, OCE will develop and document a baseline of compliance to NPR 7120.5D. Gaps will be identified, and mitigation plans will be required with the goal of reducing and ultimately eliminating the gaps. On future visits, the number of gaps at each Center will be noted, and this metric will be used to identify trends over time. OCE will provide this information to OPII for the purpose of monitoring progress against this Plan. Appropriate baselines and targets will be identified as this activity progresses.

INITIATIVE A2: Improve Management Oversight of Project Cost, Schedule, and Technical Performance–State of the Agency Reporting

Description

This initiative addresses the ongoing effort to establish a program of rigorous, independent assessment of program/project technical, cost, schedule, and programmatic performance, against established baselines by NASA's senior management. This is a fundamental improvement to management oversight of program/project status. NASA has initiated an independent performance assessment of key programs and projects within each mission-specific area. This impact assessment and action planning also provide a cross-organizational assessment of issues seen common to the specific mission area reviews, which the Agency leverages in a systemic manner. These efforts provide the basis of knowledge for key programs and projects that can lead to predictive performance management.

Both the NPR 7120.5D review structure and the "State of the Agency" process, addressed in this initiative, build upon layers of extensive program/project reviews and oversight occurring at the Program/Project, Mission Directorate, and Center levels. Focused management attention at each of these levels is essential to successful program/project performance.

For State of the Agency reporting, criteria have been developed for cost, schedule, technical, and programmatic performance (i.e., criteria on reported Earned Value Management data). The program and project offices prepare monthly status reports--Figure 2 presents a highly summarized monthly worksheet, illustrating the four rating criteria. The program and project offices report monthly results to independent evaluators representing the Offices of Chief Engineer, Program Analysis and Evaluation (PA&E), and Safety and Mission Assurance (OSMA). These reviewers assess and develop a consensus on program and project technical, cost, schedule, and programmatic performance. Using the technical, cost, schedule, and programmatic ratings, the evaluators then develop the project rating for reporting quarterly to the Program Management Council (PMC). The Mission Directorates present the issues and planned actions to correct unsatisfactory performance.

In addition, the reviewers also evaluate the program/project information to identify crosscutting technical or nontechnical issues that may have broader implications to Agency performance. This information can then be leveraged in a systematic way.

Additionally, this State of the Agency information is planned to provide the cost and schedule basis for major program performance reporting to the Office of Management and Budget as directed in the U.S. National Space Policy Directive (NSPD) 49, and to Congress as required by the section 103(b) of the National Aeronautics and Space Administration Authorization Act of 2005 (P.L. 109-155). This module of State of the Agency is currently under development as a part of Initiative E within this document.

The State of the Agency process is now in place for all key programs and projects. Its current form and format are most suitable for programs/projects in the formulation or development phase. As it evolves, the State of the Agency process will be adjusted as necessary to improve its suitability for reporting status and predicting threshold issues on the Agency's operational programs, such as the Space Shuttle and International Space Station, as well as Research and Technology programs.

Projects	TECH	COST	SCHED	PROG	COMMENTS
Alpha	Y	Y	Y	G	Requirements push-back with weight and contract cost risk. Mass allocation and acoustic loads impact risks.
Beta	Y	G	Y	G	Mass allocation, including maintaining performance while improving operability. XXX schedule risk.
Delta	Y	G	G	G	Immature requirements.
Gamma	Y	Y	Y	Y	Requirements uncertainty. Operations support schedule for Alpha. Mods impacts to cost.
Epsilon	G	G	Y	G	Co-manifested payload risk. Schedule slack below recommended to October 31 launch
Omega	Y	Y	Y	G	Schedule risk. Input behind need date.

Figure 2, Sample Monthly Project Technical/Cost/Schedule Worksheet.

Expected Outcomes

- Leading indicator to management of technical, cost, schedule, and programmatic performance issues;
- Independent assessment of projects and programs;
- Consistent methodology for review and performance assessment;
- Provide the technical, cost, schedule, and programmatic basis for external reporting; and
- Feedback to programs, projects, and Mission Directorates.

Accomplishments

June 2006	State of the Agency process chartered by PMC
August 2006	Evaluation criteria established and first program/project review held
Monthly	Project technical, cost, schedule, and programmatic performance data collected
Monthly	Through ongoing monthly reviews, discovery of both technical and non-technical cross-cutting issues and ensuing action plans
Quarterly	Each program and project reviewed with PMC (except for a limited number that are reviewed biannually)

Actions Required to Complete

State of the Agency process has been implemented and will continue to improve in line with additional initiatives identified in this Plan. January 2008 update: The State of the Agency has been renamed the Baseline Performance Review (BPR), which takes place on a monthly basis. The process was significantly enhanced in the November/December

2007 timeframe to add multiple new features, including standard financial reports and tracking of institutional metrics and contract growth and risk factors that can contribute to eventual project cost and schedule growth. The changes have focused the meetings and have made them more interactive. As a result, Agency managers can more effectively penetrate issues surrounding the programs and projects. The additions to the process have been produced in conjunction with the work on Initiative E of this CAP, and will provide some leading indicators of cost and schedule growth that will aid with achieving the goals of that initiative as well.

Impediments/Challenges

- Timely collection and assessment of the program/project data
- Financial system reporting and data accuracy are key to this effort

Metrics

The Agency's goal is that projects that are predicted to breach internal NASA cost and/or schedule thresholds (which are lower than Congressional cost and/or schedule thresholds), as a minimum, will be highlighted to senior management during the State of the Agency portion of the monthly PMC meeting in order to allow pre-emptive action(s), if any, to be taken to minimize breaching a Congressional cost and/or schedule threshold. This is an integrative outcome metric which is linked to Initiative E3. The specific target for this metric is zero instances of noncompliance over three consecutive State of the Agency reports (which occur quarterly). Noncompliance is defined as any instance in which a project breaches internal NASA cost and/or schedule thresholds without having predicted such breach and without having previously highlighted such prediction to senior management during the State of the Agency portion of a monthly PMC meeting. Noncompliance will be determined through OCE analysis of project cost/schedule projections and State of the Agency submissions. OCE will report the number of noncompliances quarterly to the Associate Administrator for senior management attention and to the Office of Program and Institutional Integration (OPII) for purposes of monitoring progress against this Plan.

Appendix B

AGENCY STRATEGIC ACQUISITION APPROACH

Focus Areas: Program/Project Management and Standard Business Processes

Lead Executive: Richard Keegan, Director, Office of Program and Institutional Integration

Supporting Organization(s): Offices of the Chief Engineer, Program Analysis and Evaluation, Procurement, and Chief Financial Officer

Description
This initiative introduces two senior-level leadership forums for the purpose of ensuring that the Agency acquisition process is better integrated with the strategic planning and budgeting process. The new forums are the Acquisition Strategy Planning meeting (ASP) and the Acquisition Strategy Meeting (ASM). The ASP and the ASM will precede the previously established Procurement Strategy Meeting (PSM).

Expected Outcomes
This new approach toward acquisition planning will strengthen, standardize, and formalize the process for developing key program/project strategies. The ASP and the ASM will provide a formal opportunity for senior leaders to ensure early on that individual program/project planning is congruent with higher level Agency strategies and commitments. This construct will form the initial fundamental program/project framework consistent with the Agency mission portfolio, forming the foundation for program/project life-cycle cost and performance management.

Accomplishments

- Policy revisions completed:
  - August 2006 Effective date of NASA FAR Supplement, Procurement Notice 04-16, "Acquisition Planning Changes: Procurement Strategy Meeting and Master Buy Plan Submission"
  - March 2007 Effective date of NPR 7120.5D, Space Flight Program and Project Management Requirements (as noted under Initiative A1)

- ASP/ASM/PSM meetings held:
  - April 2007 ASP held regarding Agency Information Technology Strategy
  - June 2007 ASP held regarding Agency mission portfolio, with emphasis on workforce

  PSMs routinely held, including--
  - January 2007 Tracking and Data Relay Satellite System
  - February 2007 Ares V Core Stage RS-68B Engine Acquisition
  - February 2007 Ares I Instrument Unit Production Acquisition

April 2007	Constellation Space Suit System:
May 2007	GOES-R

Actions Required to Complete

March 2008	Hold another ASP, document lessons learned, and take any necessary actions to improve the process. January 2008 Update: an ASP was held in November 2007. ASP discussions identified numerous actions which are currently underway. This milestone is on track for timely completion.
March 2008	Hold an ASM, document lessons learned, and take any necessary actions to improve the process. January 2008 Update: at the time this milestone was established, it was anticipated that a particular ASM would be programmatically appropriate by March 2008. At this time, the responsible Mission Directorate is refining its requirements definition and associated strategies in order to ensure that the ASM will be productive. The organization is actively preparing for an ASM, including scheduling a series of "pre-ASM" strategy sessions, but it appears that the ASM itself may not take place by the end of March 2008. The milestone date will be updated if necessary when the ASM is scheduled.
December 2008	Revise applicable policy documents accordingly. Finalize revisions to the 7120 series. These revisions will be tracked under Initiative A, Program/Project Management Requirements and Implementation Practices. This action encompasses other (non-7120) policy documents, such as the NASA Financial Management Requirements.

Impediments/Challenges

- The new meetings may be seen to negatively impact program/project schedules.
- Decisions that are optimal for the Agency may not be optimal for a given program/project.
- The approach calls for more communication and cooperation between Mission Directorates and the Mission Support Offices.

Metric

Note how and whether ASP and ASM decisions are factored into the budget process and into program/project planning. Document the impact of such decisions as compared to the intent of the initiative (i.e., improved integration of the Agency acquisition process with the strategic planning and budgeting process and greater congruence of individual program/project planning with higher level Agency strategies and commitments). The associated ASP/ASM summary records will be prepared by OPII within 120 days of each ASP and ASM meeting. OPII will provide a synopsis of results to the Deputy Administrator semiannually for senior management attention and will use the information to monitor progress against this Plan.

Appendix C

CONTRACTOR COST PERFORMANCE MONITORING

Focus Areas: Program/Project Management, Cost Reporting Process, Cost Estimating and Analysis, Standard Business Processes.

Sponsoring Executive: Richard Keegan, Director, Office of Program and Institutional Integration (OPII)

Lead Executive: Michael G. Ryschkewitsch, Chief Engineer

Supporting Organization(s): Offices of the Chief Financial Officer; Procurement; Safety and Mission Assurance; Program Analysis and Evaluation; Integrated Enterprise Management Program within the Office of the Chief Information Officer; NASA Shared Services Center; Mission Directorates; Mission Support Offices

Description
This effort will review, analyze, and potentially reengineer NASA's contractor cost reporting performance monitoring process to ensure that needed data elements are available for effective contract management, performance monitoring, and Agency financial management. Examples of review topics include work-breakdown-structure (WBS) alignment with cost reporting and contract line item structure, and reconciliation of cost-related deliverables and systems. This is a substantive integrative cross-functional initiative that will involve multiple organizations and functions.

Expected Outcomes
As a result of this effort, NASA will be able to obtain from its contractors the financial data and performance information needed to assess progress on its contracts and the data needed for effective Agency financial management through a streamlined and integrated process. This information will also be used to enhance Agency procurement, cost estimation, and overall cost management processes.

Accomplishments
As a precursor to this overarching initiative, NASA has recently enhanced the contractor cost reporting process via NASA Form 533M, Financial Management Report, to properly account for the acquisition of capitalized Plant, Property and Equipment (PP&E) assets. This has entailed the following actions to date:

- Identified required revisions to Agency-wide policy/process documents
  - NPR 7120.5D, described in Initiative A1, now establishes the requirement for Project Managers to determine Alternative Future Use for capitalizable assets and, in consultation with the Office of the Chief Financial Officer (OCFO), to identify capital acquisitions from project inception.

  - New Capital Purchase coverage has been incorporated in the Financial Management Requirements (FMR), Volume 6, Chapter 4, Plant, Property and Equipment (PP&E).
  - NPR 7120.8, for research and technology projects, described in Initiative A1, will establish the requirement for Project Managers to determine alternative future use for assets that can be capitalized and to identify capital acquisitions from project inception.
- Provided Business Process Requirements for the IEMP Integrated Asset Management PP&E Module.
- Cross-functional meetings have been held (including representatives from the Offices of the CFO, Program and Institutional Integration, Chief Engineer, Program Analysis and Evaluation, Procurement, the logistics function within the Office of Institutions and Management, and the Mission Directorates) to discuss associated potential changes to the contractor cost reports (NF533M) and the WBS structure as well as to integrate changes to property management practices.
- An IEMP System Change Request has been submitted in order to have a capital asset indicator added to both the SAP and Meta Data Manager (MdM) data systems, which will allow for flagging of costs from inception.
- Management/Business System Integration Group (M/BSIG) approved issuance of contractor cost requirements to IEMP and to OPII.

December 2007	Team leader is appointed by OCE. January 2008 Update: This milestone was originally scheduled for November 2007. OCE sought to appoint a Center employee with operational field experience to this role. Additional time was needed to finalize the assignment.
January 2008	Team leader confirms Team membership and holds first of a sequence of team meetings. Team includes appropriate representatives from Mission Directorates, Center Program Management, Chief Engineer, Chief Safety and Mission Assurance, Procurement, IT Systems, OCFO, and other needed representatives who have the knowledge and experience needed for the reengineering effort. OPII will provide executive-level endorsement of this Team. January 2008 Update: This milestone was originally scheduled for November 2007. Completion was delayed due to the delay in appointing the team leader. The Kick-Off meeting took place in January 2008, with appropriate representation from the stakeholders.

Impediments/Challenges

- Appropriate representation on the team that will be implementing this initiative is essential. The representatives need to both be knowledgeable and have the authority to speak for their communities. January 2008 Update: senior management was involved in successfully recruiting and assigning the team members as well as the

team leader. The technical and functional communities are well supported on the current team.

- Competing priorities of team members may impact the quality of the analysis, the effectiveness of the resulting process, and the timeliness of project completion. January 2008 Update: a continuing challenge is anticipated in this respect. The team leader is taking appropriate actions to mitigate the impact of competing priorities, with the assistance and support of senior management.
- Implementing the revised (reengineered) integrated process will be complex.

Actions Required to Complete

March 2008	Team establishes charter and scope document. January 2008 Update: this milestone was originally scheduled for December 2007. The team charter and scope document has been drafted and is currently being edited by the team. Elements of the detailed plan (see next milestone) will be incorporated into the charter. Formulation-phase activities and two significant reviews with the initiative's customers will be defined and scheduled in the Charter.
March 2008	Team establishes detailed plan for the effort, which includes the following team activities: using requirements defined and examined through ongoing initiatives, identify contract cost elements that are necessary for effective contract management, contract performance monitoring, and Agency financial management; and conduct a gap analysis by determining whether the identified contract cost elements are already reported to NASA by contractors, identifying any data that is currently unnecessarily reported, and determining the contract cost elements that are necessary but not already being reported. The plan also includes initial metrics. This Initiative is updated accordingly. January 2008 update: the team is currently incorporating the detailed plan for the initiative's formulation phase into the charter. The detailed plan for the initiative's implementation phase will emerge as the effort approaches a preliminary design. These activities will be based on the project events outlined in NPR 7120.D and NPR 7123.1A, as tailored to reflect the unique challenges of this initiative. The team is currently defining the potential timing and content of a System Requirements Review and preliminary process/system design.
April 2008	In anticipation of meeting the September 2008 milestone, Team holds a midterm progress review, which includes Agency senior managers as appropriate.
September 2008	Team completes its set of recommendations for a reengineered contractor cost reporting process.
March 2009	Recommendations have been analyzed by technical systems, legal, procurement, and M/BSIG, and most practical solutions (including

	consideration of reporting methods and data systems) have been identified.
June 2009	All necessary briefings have been completed and management approvals obtained.
July 2009	Contractual policy changes are made to ensure that the new contract cost data are submitted to NASA via the required reporting vehicle and timeframe.
December 2009	Policies and processes changed; employees and contractors trained; business tools changes accomplished; and reengineered process implemented.

Metric

Leadership of this Team is currently transitioning from the Office of the Chief Financial Officer to the Office of the Chief Engineer; applicable metrics will be determined and identified in an update to this Plan. NASA anticipates that these metrics will document the specific process improvements achieved and the beneficial changes to data access accomplished under this initiative. January 2008 update: The team anticipates determining baseline performance of current processes as well as determining key performance parameters for the to-be (future state) system functions.

Appendix D

PROJECT MANAGEMENT TRAINING AND DEVELOPMENT

Focus Areas: Program/Project Management, Cost Reporting Process, Cost Estimating and Analysis, Standard Business Processes.

Lead Executive: Michael G. Ryschkewitsch, Chief Engineer

Supporting Organization(s): Mission Directorates, Mission Support Organizations, Centers

Description
This initiative addresses the ongoing effort to enhance the NASA Academy of Program/Project Engineering Leadership (APPEL) curriculum with additional emphasis on project planning, scheduling, Earned Value Management (EVM), and performance analysis through experienced-based training courses. The enhanced courses will offer a blend of foundational concepts, best practices, and practical lessons-learned that are taught through lecture, group discussion, problem solving, and case studies.

APPEL's Program/Project Management curriculum is intended to prepare program/project managers for the challenges of leadership. As the Agency's mission focus changes, the program/project management training curriculum is changing both the Core Curriculum and in-depth courses. In furtherance of this Plan's goal, all training initiatives will be realigned to emphasize the importance of managing projects within the cost, schedule, and technical baselines. Strategies and tools will be introduced to the learners to enable them to improve all aspects of mission success. APPEL will conduct follow-up assessments to determine the effectiveness and application of learning objectives to meet this goal. Based on the results of those assessments, APPEL will make adjustments to the course material and teaching techniques to maximize the effectiveness of these potential culture-changing encounters with the project teams.

The Program/Project Management core curriculum has been revised into the following four learning segments:

- Foundations of Aerospace at NASA
  - Overview of NASA: vision, mission, governance model
  - Aeronautics and astronautics concepts
  - Teamwork and communication skills
  - Agency organization and programs
- Project Management and Systems Engineering
  - Project Management and Systems Engineering overview
  - Requirements definition
  - Acquisition
  - Systems definition, realization, and evaluation
  - Operations

    - Risk management
    - Planning, scheduling and budgeting, control and assessment
  - Advanced Project Management and Systems Engineering
    - Successes and failures in real-life projects
    - Designing for and dealing with complexity
    - Leadership approaches and techniques
  - Executive Program
    - Examination of executive decisions and challenges related to previous NASA programs and projects
    - Key risk management factors and best practice framework
    - Strategic thinking and leadership skills

APPEL's in-depth course curriculum for program/project management has also changed, in concert with the issues addressed in this Plan. Targeted courses in project scheduling, earned value management, and performance analysis have been added to the curriculum. These courses, delivered at introductory and advanced levels, focus on improving the skills and proficiency of not only the project manager but also of key team members. By participating in one- to two- day progressively more advanced training courses, attendees can obtain the maximum benefit from the course material while having the minimum impact on project operations.

APPEL has also implemented the highly successful Project Management (PM) Challenge. This two-day conference for NASA project managers and their teams focuses on the importance of program, project, and engineering management to mission success. It examines current trends in project management while offering cutting-edge training sessions on best practices, innovative case studies, compelling discussion panels, and lessons-learned from projects both within and outside of the Agency.

Expected Outcomes

The outcomes of these training initiatives are a project management workforce that understands ways to better manage complex projects through greater use of sound practices in scope management, schedule/cost/technical performance management, communications management, procurement management, and risk management. These outcomes further enhance the opportunities for NASA to successfully execute its programs and projects within cost and schedule constraints.

Accomplishments

- APPEL completed a program/project management curriculum assessment in August 2006, resulting in a revitalized curriculum. The following courses are now available as offerings in the APPEL curriculum:
    - Core Curriculum
        - Foundations of Aerospace
        - Project Management and Systems Engineering
        - Advanced Project Management and Systems Engineering
        - Executive Program
    - In-Depth Curriculum
        - Earned Value Management Overview
        - Understanding Earned Value Management
        - Understanding Project Scheduling
        - Beyond Earned Value Management Basics
        - Beyond Scheduling Basics
        - Advanced Earned Value Topics
        - The NASA Budget Process
        - Integrating EVM with Acquisition
- Planning, Scheduling, Budgeting and Control courses, including Earned Value Management, have been successfully delivered to over 1,200 participants throughout the Agency.
- APPEL project management courses have been designated as "PMI (Project Management Institute) Registered Education Provider" courses, allowing participants to earn Professional Development Units (PDU) for completion.
- NASA completed four highly successful PM Challenge conferences with 3,800 participants.

November 2007 — Prepare briefing for the PMC and the Program and Project Management Board on the Core Curriculum and In-Depth Courses. January 2008 Update: The intent of this milestone is to engage senior leadership in the development of NASA personnel with the knowledge and skills needed for effective contract and financial management. Given that goal, the Director of the Academy of Program/ Project and Engineering Leadership (APPEL) has held a series of briefings on the APPEL program with NASA leaders. APPEL's strategy for informing senior leaders about the program and receiving their approval or agreement to act has been to participate with them in small strategy sessions. Meetings have been held on the current program with the Administrator, Deputy Administrator and most recently in January 2008 with the Associate Administrator. In addition, the APPEL Director is scheduled to speak on February 26, 2008 at NASA's Program Management (PM) Challenge event on: "OMB and GAO Project Management Certification Requirements Response and Implementation." The PM Challenge has almost 1200 people

	registered, including many of NASA's most senior managers and in particular the program/project leadership of the Agency. Given this overall communications strategy, presentations to the PMC or Project Management Board are not considered necessary, and this milestone is considered closed in light of ongoing activities.
Ongoing	Continue course offerings, assuring access and availability to all Centers. January 2008 Update: NASA has continued to expand offerings of courses related to contract/financial/project management, introducing three new courses since November 2007. This milestone is considered completed in light of these ongoing activities.
November 2007	In OCE communications vehicles, such as ASK Magazine, ASK OCE and Web sites, publish requests for practitioners to adopt best practices regarding project management practices for performance measure baseline control, scheduling, and performance measurement and evaluation, and to share related experiences and lessons learned within OCE publications, the Masters Forum, and the PM Challenge. January 2008 Update: NASA APPEL asks practitioners to share engineering and project management knowledge and best practices. Such messages are embedded in the APPEL Website and *ASK Magazine* (published three to four times a year). The APPEL Director verbally requested people to participate in such efforts at the October 2007 Knowledge Sharing Masters Forum. Similar messages were incorporated into the January 2008 inaugural issue of Ask the Academy, an online communication of the Office of the Chief Engineer. Sharing knowledge and best practices is core to the mission of NASA's Academy of Program/ Project and Engineering Leadership (APPEL).The Academy plans to continue to encourage these activities and to focus attention on the critical areas of contract, financial, and project management. This milestone is completed.

Actions Required to Complete

July 2008	In accordance with OMB's Federal Acquisition Certification (FAC) for Program/Project Managers, NASA is establishing the APPEL Technical Leadership Institute (TLI) as a mechanism that provides Agency recognition (certification) for professional development of program and project managers at successive career levels. NASA has analyzed and aligned its experience, competencies, and training experience with those outlined under Federal certification requirements and will identify and begin tracking the number of designated Program/Project Managers by November 2007. January 2008 Update: This milestone was originally scheduled for November 2007. Its completion date is

	extended to July 2008 in light of the complexity of the effort. Current status is as follows. NASA's APPEL presented plans for NASA's Technical Leadership Institute to representatives from all NASA Centers on November 13-14, 2007 to engage them in the implementation process. In January 2008, APPEL developed a preliminary list of program/project managers of major projects to serve as a basis to identify and begin tracking designated program/ project managers in accordance with OMB's Federal Acquisition Certification (FAC) for Program/Project Managers. The preliminary list is now being reviewed and validated. Constructing the list of designated program/project managers is a rather complex process that involves senior managers in several NASA departments who will view potential participants from multiple perspectives (e.g. current project assignments and size of projects) in order to meet FAC and NASA criteria. It may also involve validating information within Centers and Mission Directorates. This is a very high priority and personnel are working to complete it.
March 2008	Complete development of new Executive Program course materials

Impediments/Challenges

- Limited time availability of program/project managers and team members.
- Maintaining funding for instructors through APPEL.

Metrics

The following measures will be undertaken to assure that the revised and more focused NASA training curriculum, as well as other related learning and developmental activities, is having the expected outcomes of improving program/project consistency in achieving budget and schedule commitments and building expertise in project management practices for baseline control, scheduling, performance measurement and evaluation. The metrics will be maintained by OCE and will be provided to OPII quarterly for the purpose of monitoring progress against this Plan.

1. Core Curriculum and In-Depth Courses related to key focus topics: this initiative targets a 15-percent increase in total number of participants. This target is based on actual attendance over the past FY for the NASA Program/Project Management population; the historical attendance from each Center; projected needs of the Agency; and the career development budget for the Academy. This would be an increase from 814 participants in FY 2007 to 939 participants in FY 2008. January 2008 Update: Currently ahead of target. Total FY2008 attendance through January 2008 was 483: 76 in October and another 407 since the CAP was finalized (that is, from November through January).
2. The APPEL Curriculum Manager, working with Mission Directorate representatives, will identify project team member training deficiencies and prepare a schedule of training offerings by April 2008. Training attendance will be monitored, and appropriate metrics will be established. The role of NASA practitioners will drive identification of the training population, as well as the identified performance level of

the practitioners in the NASA Technical Leadership Institute (TLI) in terms of identified competencies and desired capabilities. NASA APPEL conducts a semi-annual curriculum review that ensures alignment to Agency requirements, objectives, and priorities. These semiannual reviews will capture key aspects of this Plan's initiatives for incorporation into the curriculum, for example, the cost estimating policy changes identified in Initiative E. TLI requirements were analyzed and compared to the FAC PPM requirements, and the NASA program was found to meet or exceed all requirements in terms of curriculum and levels of performance. Training metrics will be defined qualitatively and quantitatively in multiple formats (paper-based, Web surveys, interviews, observations, and reviews), encompassing customer service feedback during and immediately following career development activities; Center-based management and curriculum reviews; Individual Development Plan (IDP) and Professional Development Portfolio (PDP) reviews, and Program Reviews that analyze return on investment.
January 2008 Update: The needs analysis to identify deficiencies is to begin in February 2008. A semi-annual curriculum review was performed in November 2007, and the subsequent review will be scheduled after the needs analysis. This item is on track.

3. Senior management emphasis on project and contract management will be demonstrated through issuance of the following publications with target numbers as follows:
    A. ASK Magazine articles/stories targeted on project planning, performance monitoring, analysis, and reporting. Target: 2 or more in FY 2008
    B. Case Studies. Target: 1 or more in FY 2008
    C. ASK OCE. Target: 1 article per quarter in FY 2008
    D. APPEL Web site and NASA Engineering Network. Target: 1 story bi-monthly

    January 2008 Update: This activity is on track. For Item A, there were two stories in the Fall Issue. For Item B, a case study is under development. For Item C, the January Ask the Academy, posted on the APPEL website, had four related stories including a message from the APPEL Director. For Item D, the website story is in place.
4. For the Masters Forum, this initiative targets a 10-percent increase in NASA's participation based on actual attendance over the past FY for the NASA PPM population; the historical attendance from each Center; projected needs of the Agency; and the career development budget for the Academy, which would be an increase from 91 in FY 2007 to 100 in FY 2008.
    January 2008 Update: Participation in the October FY2008 Masters Forum was 8 shy of the targeted 50. APPEL will increase attendance targets for the Spring Forum, and Center Forums are also planned. This activity is on target.

Appendix E

IMPROVING LIFE-CYCLE COST/SCHEDULE MANAGEMENT PROCESSES

Focus Areas: Program/Project Management, Cost Reporting Process, Cost Estimating and Analysis, Standard Business Processes.

Lead Executive: Scott Pace, Associate Administrator for Program Analysis and Evaluation

Supporting Organization(s): Offices of the Chief Engineer, Program and Institutional Integration, Mission Directorates, Procurement, Chief Financial Officer

Description

NASA policy requires life-cycle cost management of all its space flight and supporting institutional programs and projects and uses this to set budget requests and portfolio investment decisions. The Agency has recently been the recipient of Congressional legislation and White House requirements that shape this policy. These new requirements on the Agency also consist of tracking development contracts greater than $50M for cost growth on projects still in formulation. NASA must establish a more complete set of processes, policies, and tools in order to achieve more effective life-cycle cost management, including contract cost and schedule management. The integrated approach that NASA will take, including the recent efforts to perform better life-cycle cost and schedule management of its programs and projects, follows.

NASA programs generally integrate discrete projects and have a life-cycle cost that is mostly equivalent to the summation of all its projects. (Although there may be additional funding for technology development, program/project management, reserves, corporate and Center overheads, a large portion of the funding is within the projects.) Hence, life-cycle cost/schedule management is usually performed at the project level. There are some exceptions when a program is a single project such as the International Space Station, the Hubble Space Telescope, or the James Webb Space Telescope. The majority of NASA's budget is in, and thus the focus of this reporting is on, space flight projects and their supporting institutional systems. Further, NASA conducts the development of these projects with a mix of in-house and contracted expertise, both of which factor into the estimating and then tracking of growth in cost and schedule of a project.

This section describes a set of activities that are designed to lead to more effective life-cycle cost and schedule management, which requires the following:

- Good life-cycle cost-estimating policy and processes. (Sets good baselines.)
- Instituting tracking and trending methodologies and using "best practice" tools to predict when the life-cycle estimate changes. (Proactively predicts baseline drift and violation of that baseline.)

- Effective risk identification, and planning for the costs to mitigate and deal with these risks if they manifest. (Manages threats to life-cycle cost/schedule changes.)
- Clear reporting requirements and responsibilities. (Assures accountability.)
- Making budget planning and allocation decisions based on predicted life-cycle cost/schedules and the performance toward these. Budget allocations may be decided by external stakeholders, based on their understanding of the Agency's performance among other considerations such as political, policy, and market factors.

NASA has been working to address process and policy gaps regarding several of the above areas and is planning to take further actions toward that end. These activities are described as a series of initiatives in the subsections below. (NASA's effort is in concert with the GAO Cost Assessment Guide.) These initiatives describe cost estimating, tracking, and reporting processes and policies that have been or will be introduced into NASA program/project management and performance management processes. Since these initiatives must be integrated to produce results, some of the metrics used to assess their effectiveness are also integrative.

NASA is instituting the following initiatives to ensure that more realistic cost estimates are prepared:

- Budget estimates based on the reconciliation of the project-generated estimates with Independent Probabilistic Life-Cycle Cost Estimates (IPCE) that assure life-cycle costs are planned to a 70-percent confidence level;
- Continuous cost risk management requirements;
- Collection and dissemination of planned and actual project descriptions, technical cost driver data, schedules, and costs through a document known as the Cost Analysis Data Requirement (CADRe);
- Focused education, coordination, and concentrated training on reasons for cost and schedule growth, as well as continued investment in state-of-the-art estimating techniques and tools; and
- Investment in alternate cost-estimating methods and tools.

NASA is also planning the following three initiatives to better measure performance and lay the foundation for better control of cost and schedule as programs and projects proceed through the various phases of development and implementation:

- Institution of regular cost and schedule tracking and reporting processes at the various Management Councils through the State of the Agency process, to serve as the leading indication of Congressional and OMB baseline breach reporting;
- Quarterly and/or annual baseline and updates-to-baseline reporting to Congress and OMB on key programs and projects; and
- Key policies are being revisited on standardization of yearly cost-accounting differences in the estimation and tracking of life-cycle costs/schedules, reserve strategies, and rebaselining.

The following subsections describe the ways these initiatives impact this Plan's Focus Areas.

INITIATIVE E1 Improved Cost Estimation

Lead Executive: Scott Pace, Associate Administrator for Program Analysis and Evaluation

Supporting Organization(s): Office of the Chief Engineer, Mission Directorates

Description
NASA policy requires life-cycle cost management of all its space flight and supporting institutional programs and projects. Toward that end, NASA's risk management policy requires that project managers (PM) identify, quantify and manage risks. By doing so, PMs will be more cognizant of the project risks and will, therefore, be in a better position to develop meaningful mitigation action plans and to continuously manage those risks. The risk posture of a program or project is an important factor in producing a credible cost and schedule estimate. Further, new policy at NASA requires that IPCE be developed and that these estimates must be reconciled with PM estimates to formulate a budget that is based upon a 70-percent probability that the final number will be less than or equal to the submitted budget number. To do this, the Agency must fully embrace cost-risk analysis and have the proper tools and procedures to do so. This is a fundamental change to the way NASA has previously done business in this area.

Prior to this policy shift, PMs were required to identify significant risks and possible consequence but were not required to quantify those risks and to indicate the Unallocated Future Expenses (UFE) were sufficient to cover those risks. When this new policy is fully enacted, PMs must not only identify potential risk but must also quantify those risks, submit estimates that reflect a reasonable probability of completion, and justify the need for program and project UFEs through those estimates. This policy will be an on-going requirement for the NASA budget formulation process and program/project planning.

In order to develop credible IPCEs, estimators and cost analysts need reliable state-of-the-art tools. NASA currently uses a variety of well-known parametric tools to develop its IPCEs. However, these tools need continued support to keep abreast of the latest cost-estimating methods and data. As of this writing, these tools are able to provide probabilistic life-cycle cost estimates, but they are insensitive to timing issues, which are a key element of good estimation. In short, they lack the maturity to allow estimators to develop a combined cost and schedule probable cost estimate, so that analysts may provide year-by-year probabilistic estimates.

The initiatives to better estimate costs and schedule and provide reports also require coordination, education, and training. Managers need to understand the root cause of cost and schedule growth, and they must be consulted on steps to deliver the project on time and within the requested budget resources. They also need to understand the estimating, reconciling, and reporting requirements and processes.

Expected Outcomes

- More realistic cost estimates with sufficient Unallocated Future Reserves to cover the identified risks.
- Tools that will allow cost estimators to provide credible probabilistic cost estimates that are time sensitive.
- Both internal and external stakeholders who will better understand the potential risks for cost and schedule growth and realistic mitigation actions.
- Increased likelihood of, and frequency with which, projects are delivered at or before planned dates and at or under the estimated budget.

Accomplishments

- Drafted update to NPR 8000.4, Risk Management Procedural Requirements.
- Drafted text for an upcoming update to NPD 7120.4, Program/Project Management, which will finalize the requirement to submit budgets that reflect a 70-percent confidence level.
- Developed IPCE policy through the Strategic Management Council and issued FY 2009 Strategic Planning Guidance for budget formulation that directed projects to budget to the 70-percent confidence level of the reconciled IPCE.
- Identified weaknesses of available cost and schedule estimation models and of current IPCE tools through several cost community workshops.
- Developed draft training plan on various acceptable methods to develop IPCE and reconcile with project estimates.

November 2007	Finalize IPCE training plan. January 2008 Update: This milestone was originally scheduled for October 2007 and was completed in November 2007. The training will be performed during spring of 2008. Training has been completed for GSFC and JPL. GRC, KSC, and HQ are planned to be trained by the end of February, with the remaining Centers to follow.
November 2007	Identify the remaining well-known reasons for cost and schedule growth through a cost-analysis symposium and a one-day cost and schedule growth summit. January 2008 Update: The symposium and summits were held, and this milestone was completed in November 2007 through a briefing to the Associate Administrator. Follow-up analyses are now underway.
December 2007	Finalize and codify the current new draft policies into NASA risk management and program/project management policy documents. January 2008 Update: This milestone was completed in December 2007, when the proposed new policies on cost estimating and risk management were provided to the responsible organizations (the Office of the Chief Engineer and the Office of Safety and Mission Assurance) for incorporation in subsequent issuances.

Actions Required to Complete

March 2008	Train the cost-estimating community and NASA space flight project staffs at all Centers using a focused wave approach.

September 2008 Complete and test new IPCE cost risk management tools.

Impediments/Challenges
- Reliable IPCE results – a training challenge.
- Competing priorities and limited resources.

Metric
- The percentage of projects that the PMC approves to proceed into phases B or C in which PA&E deems a credible probabilistic life-cycle cost estimate was presented and will be tracked to document progress in this area. PA&E will track this metric and will provide results to OPII on a regular basis for the purpose of monitoring progress against this Plan. Baselines and time-phased targets are not yet identified. NASA anticipates that a baseline will be available by October 2008, and targets will be set subsequently.
- The percentage of projects that the APMC approves to proceed into phases B or C, which PA&E deems do not possess any "cost or schedule growth characteristics" (as defined by PA&E through the activities of this initiative), will be tracked to document progress in this area. PA&E will track this metric and will provide results to OPII on a regular basis for the purpose of monitoring progress against this Plan. Baselines and time-phased targets are not yet identified. NASA anticipates that a baseline will be available by October 2008, and targets will be set subsequently.

INITIATIVE E2 Improved Data Collection: Reporting CADRe

Lead Executive: Scott Pace, Associate Administrator for Program Analysis and Evaluation

Supporting Organization(s): Office of the Chief Engineer, Mission Directorates

Description
NPR 7120.5 requires project managers to submit planned and actual descriptive, technical, and cost information at Key Decision Points (KDPs) A, B, C, D & E through the CADRe, a document that consists of three separate templates. Part A describes the project; Part B, a spreadsheet, requests key technical data (including software) that drives costs; and Part C, also a spreadsheet, includes planned and actual cost data by the PM's Work Breakdown Structure (WBS) and a standard WBS. PMs may place the CADRe on contracts or may request (in the Request for Proposals) that the information be made available on an as-needed basis. Currently, NASA is utilizing support contractors to develop the CADRe from PM-supplied data, and then the PMs approve the CADRes. The developed and collected CADRes (past and future) will be placed into a Web-based repository so that the NASA cost community may use the information to develop improved cost estimates.

Expected Outcomes

- Exception reporting may reduce cost and schedule overruns.
- Historical cost data will improve the quality of estimates because they will be based on historical actuals.
- NASA will have a better record of the reasons for cost and schedule growth and will be in a better position to take corrective management actions.

Accomplishments

- Drafted and agreed upon standard CADRe templates for unmanned missions.
- Drafted standard CADRe templates for crewed missions.
- Sponsored development and completion of 35 CADRe events.
- Planned and scheduled completion of remaining CADRe events over the next two fiscal years.

January 2008	Agreed upon standard CADRe template for manned missions. This milestone is completed.
December 2007	Completed 50 CADRes (cumulative). This milestone is completed.

Actions Required to Complete

Complete development of 150 CADRe events by the following dates:

December 2008	Complete 100 CADRes (cumulative)
December 2009	Complete 150 CADRes (cumulative)

July 2008	Develop "One NASA Cost Estimating" (ONCE) training course.
September 2008	Complete development and deployment of a Web-based system, ONCE, to make CADRes widely available.
September 2008	Develop procedures to verify when project cost estimates at starts of KDP D and E exceed the 15-percent baseline thresholds.

Impediments/Challenges

- Obtaining cooperation with project managers to provide requisite data to develop the CADRe.
- Ensuring that the PM requests the CADRe data within Requests for Proposals and that the data are provided at the CADRe level of detail. This is a significant challenge because NASA's contracting officers may be pressed to delete the requirement in an effort to save money.
- Obtaining sufficient resources to independently verify threshold estimates.

Metrics

Upon implementation of CADRe through the milestones identified in this initiative, a survey will be conducted to measure the percent of cost-estimating users who think the CADRe data meet their estimating needs. PA&E will manage this survey and will provide results and analysis to OPII for the purpose of monitoring progress against this Plan. Target scores are not yet identified. The survey is planned for completion in the summer of 2008.

INITIATIVE E3 **Improved Cost/Schedule Performance Assessments and Reporting**

Lead Executive: Scott Pace, Associate Administrator for Program Analysis and Evaluation

Supporting Organization(s): Offices of the Chief Engineer, Program and Institutional Integration, Chief Financial Officer, Procurement, and Mission Directorates

Description
NASA has been the recipient of new cost and schedule tracking and reporting requirements from both Congress and OMB. The requirements from Congress are identified in section 103(b) of the National Aeronautics and Space Administration Authorization Act of 2005 (P.L. 109-155). The OMB requirements are identified in the implementation instructions for National Space Policy Directive (NSPD) 49, U.S. National Space Policy. NASA also has an additional set of requirements through the White House Budget and Performance Integration (BPI) Initiative Scorecard, the BPI Program Assessment Rating Tool (PART) reviews of the Agency's programs, and the NASA Annual Performance Plan. Further, through governing policies on programs and projects, NASA has requirements for setting cost and schedule integrated baselines and their control. The most stringent of these requirements are on programs and projects with an estimated life-cycle cost greater than $250M that have authority to proceed into development or have a large development contract while still in formulation phase.

In light of all these related requirements, NASA is attempting to make this a single internal and external assessment and reporting process, with controlled frequency of updates and common data to meet all requirements. To date, the tracking has not been standardized and has not been on a common frequency at the Agency level. There has been tracking and reporting in various mission areas, with variation on what is estimated, tracked, reported, and the methodologies for doing so. Further, there is incomplete procedure and process in several areas of life-cycle cost and schedule management. The new processes, methodologies, and procedural requirements will be codified into NASA policies for program/project management and Agency-level performance management.

Expected Outcomes
- Greater clarity on the expectations on program/project managers for cost/schedule control, enabling better management processes and performance.
- Standard processes on life-cycle management to allow for common measures of performance across the NASA missions, to highlight where management attention is most warranted and to enable effective management solutions through the identification of systemic performance issues.
- Predictive indication of cost/schedule performance issues that allow management to address them in a more efficient manner.
- Increased accountability to, and increased credibility with, the Congress and OMB.

Accomplishments

- Redesign of NASA's Integrated Budget and Performance Document to provide baseline reports and annual updates to the Congress for "major programs", i.e. projects that have a life-cycle cost greater than $250M that have authority to proceed into the development life-cycle phase.
- Baseline or annual update reports delivered to the Congress with the fiscal year 2008 President's Budget Request on 15 of NASA's largest projects.
- Negotiation of requirements with OMB for cost tracking and reporting on major programs with authority to proceed into development and projects under formulation with development contracts.
- Developed a draft life-cycle, cost-tracking methodology that identifies which systems of record are to be used and identified business rules for producing the annual and monthly tracking and reports.
- Developed draft formats for quarterly tracking.
- Developed initial life-cycle cost/schedule tracking methodology, processes, and tracking and reporting formats. Agreed to by all internal organizations as well as OMB. This process has seen at least a quarter of reporting.

Actions Required to Complete

- Final life-cycle cost/schedule tracking methodology, processes, and tracking and reporting formats developed and agreed to by all internal organizations, OMB, and Congress.

  March 2008 — Identify all requirements from OMB/Congress.
  January 2008 Update: This milestone was originally scheduled to be complete in December 2007. Completion has been delayed and is now rescheduled because the NASA FY 2008 Appropriation included numerous new requirements for cost, schedule and contract reporting, including an additional engagement with GAO. The appropriation was not signed until late December and it is taking some time to sort through the details of the requirements and the implications on the current processes. NASA plans to meet the June 2009 completion date for this sub-initiative, albeit some interim milestones may slip due to these factors. The effort is underway, and a new data call on contract growth, award fee and status of planned acquisitions has already been implemented to address multiple current requirements and the new requirements from the FY 2008 Appropriation.

  April 2008 — Implement cost and schedule tracking and reporting process
- Revisions of NASA policy, including the NPR 7120 series, on reserve strategy, baseline control and cost estimation (note that this is in conjunction with Initiative E1 of this section and is to be completed per that planned schedule).
- Demonstrate life-cycle cost/schedule tracking and reporting integrated with State of the Agency processes

  April 2008 — Data needs and quarterly tracking/reporting formats integrated into State of the Agency - Programs and Projects process

- Process conduct and continual improvements

June 2008	Produce first series of baseline and quarterly reports to OMB and/or Congress under the final methodologies and processes
June 2009	Complete several quarters of reporting and reassess policy and process effectiveness

Impediments/Challenges
None

Metric
The following metrics will apply to the set of projects that are subjected to reporting to OMB and Congress. The metrics are designed to assure that the new "single assessment and reporting process" is fully implemented by the Agency and that this process is used to--

a. Anticipate when a Congressional or OMB growth threshold may be reached;
b. Allow senior managers to take appropriate action before a breach is reached; and
c. Contribute, in concert with the other Initiatives within this Plan, to a potential reduction in cost and schedule growth of NASA's projects.

The "single assessment and reporting process" will be run in parallel to the State of the Agency process for some time before it is integrated with it; some elements of these metrics will be duplicated between this Initiative and Initiative A2.

- By December 31, 2008, the Agency goal is that one hundred percent of projects subject to external cost/schedule reporting will comply with the new NASA methodologies, processes, and formats as designed to meet the reporting requirements of the OMB and Congress.
- By December 31, 2009, the Agency goal is that 100 percent of projects subject to external cost/schedule reporting will provide quantifiable and substantiated data to be integrated into the State of the Agency--Programs and Projects process.
- The integrative outcome metric identified in Initiative A2 will measure progress against this initiative as well. The Agency goal is that projects that are predicted to breach internal NASA cost and/or schedule thresholds (which are lower than Congressional cost and/or schedule thresholds), as a minimum, will be highlighted to senior management during the State of the Agency portion of the monthly PMC meeting in order to allow pre-emptive action(s), if any, to be taken to minimize breaching a Congressional cost and/or schedule threshold. Associated with that metric, the following measures will also be tracked as integrative outcome metrics:
    - Percent of <u>life-cycle cost growth</u>, as measured from the baseline value agreed to by the appropriate NASA decision authority at KDP-C. (This measurement will be by project and is intended to identify trends through time by fiscal year quarters.) January 2008 Update: Measurement has been made against this metric.
    - Percent of <u>development cost growth</u>, as measured from the baseline value agreed to by the appropriate NASA decision authority at KDP-C. (This measurement will be by project and is intended to identify trends through

time by fiscal year quarters.) January 2008 Update: Measurement has been made against this metric.

- Percent of schedule growth, as measured from the key milestone baseline value agreed to by the appropriate NASA decision authority at KDP-C. (This measurement will be by project and is intended to identify trends through time by fiscal year quarters.) January 2008 Update: Measurement has been made against this metric.
- Percent of contract cost growth, as measured from the baseline contract value as awarded. (This measurement will be by project and is intended to identify trends through time by fiscal year quarters.) January 2008 Update: Measurement has been made against this metric.
- Less than 10-percent cumulative average life-cycle cost growth as compared to the baselines for all projects subjected to this reporting, weighted by budget allocation. (This measurement is intended to identify trends through time on an annual basis.) January 2008 Update: Measurement has been made against this metric. The metric was not met, as there were several projects that saw growth above 10% on life cycle cost in FY 2007, the last year of measurement.
- Percentage of life-cycle and development cost and schedule growth of existing and future projects, as compared to cost and schedule growth on past projects. (This is to identify trends through time, on an annual basis.) January 2008 Update: This metric was baselined in December 2007.

PA&E reports these metrics to OMB and Congress on a regular basis and will also provide them to OPII for purposes of monitoring progress against this Plan.

Appendix F

IEMP PROCESS IMPROVEMENT

Background Information

IEMP continues to assess and improve its management processes. Recent IEMP management improvements include the following:

- Implemented improved requirements management and testing processes. These processes ensure requirements are tracked, traceable to "parents" and "children" with no "orphans," and tied to testing processes to ensure adequate verification and validation.
- Enhanced performance metrics related to tracking system defects.
- Implemented a rigorous IEMP risk-mitigation strategy that tracks cost, schedule, and technical risk and provides cost/risk integration for the mitigation of high-risk items.
- Implemented quantitative entry and exit criteria for moving from one phase of an IEMP project to another. This process reduces programmatic risk by ensuring projects complete all essential tasks associated with one life-cycle phase prior to receiving authority to proceed into the next phase.
- Aligned IEMP with the Office of the Chief Information Officer (OCIO). This realignment provides IEMP with the organizational infrastructure and authority offered by the OCIO and also supports enhanced cross-functional system integration and delivery.
- Established an IEMP PMC to provide independent programmatic oversight of IEMP.
- Established the Management/Business Systems Integration Group (M/BSIG) which is comprised of senior representatives from both the mission directorates and mission support offices. The M/BSIG is the Agency organization responsible for assessing and prioritizing the implementation of future business system requirements. The cross-functional nature of this body assures the implementation of strategic business system decisions as opposed to functionally based decisions.

Although significant improvements have been made to business system management, two IEMP process improvement activities are still in process, and these two activities are addressed in this Plan:

- Development of an Agency-wide Business System Concept of Operations (ConOps), and
- Identification of business system gaps.

INITIATIVE F1 Business Concept of Operations (ConOps)

Focus Areas: Standard Business Processes and Management of Financial Management Systems

Lead Executive: Jonathan Pettus, Chief Information Officer

Supporting Organization(s): Offices of the Chief Financial Officer, Procurement, Institutions and Management, Chief Engineer, Human Capital Management, Mission Directorates, NASA Shared Services Center, and Center Representatives

Description
This initiative entails development of a ConOps that describes the desired operational state of NASA's Agency-wide business management systems. The ConOps will address the business system needs of both the programmatic and institutional communities.

- The ConOps document will be described from an end-user's perspective. It is not intended to be a requirements document or a systems specification. It will provide a framework to focus future business management systems initiatives by defining the system boundaries, defining the major system components, and describing high-level, Agency-wide processes.
- Detailed processes will only be developed and systems modified once the Agency makes a strategic investment decision to address gaps between the "as is" and "to be" state.

January 2008 Update: NASA has held numerous workshops with the information providers, users, and customers to document the "as is" – the current state. The team is on target to complete the ConOps document in September 2008.

Expected Outcomes
The ConOps will--

- Provide a description of the system characteristics from an operational perspective.
- Facilitate understanding of the overall system goals with users (including recipients of the products of the system, where applicable), buyers, implementers, architects, testers, and managers.
- Form an overall basis for long-range operations planning and provide guidance for development and/or update of subsequent system definition documents such as the system specification and the interface specification.
- Describe the user organization and mission from an integrated user/system point of view.

Establishing this foundation will improve the Agency's ability to make strategic and tactical decisions regarding Agency-wide business systems which in turn will ultimately improve the availability of management information necessary for mission success.

Accomplishments

July 2006	Completed framework document, "NASA Concept of Operations – Business Process & Enabling Technology"

July 2006	Completed "starter pack," "NASA Concept of Operations – Business Process & Enabling Technology"
May 2007	Hired permanent IEMP Integration Manager responsible for developing ConOps
July 2007	Completed Project Management Business System Gap Identification
November 2007	Identified ConOps Stakeholders. This milestone is completed.
November 2007	Chartered ConOps Team. This milestone is completed.

Actions Required to Complete

March 2008	Confirm ConOps Scope. January 2008 Update: The initial ConOps scope was completed in November 2007, which was the original milestone date. However, through a series of discussions with senior staff, the ConOps team is currently evaluating the need to expand the scope to include several additional mission support functions. Decisions regarding expansion in scope will be finalized by March 2008.
May 2008	Develop Draft ConOps
July 2008	Refine Draft ConOps
August 2008	Perform Formal Document Review
September 2008	Baseline ConOps

Impediments/Challenges

- Appropriate representation of implementer and user communities is essential to development of the ConOps document. The representatives need to be both knowledgeable and have the authority to speak for their communities.
- Competing priorities of team members may impact both the quality of the document and the delivery schedule.
- End-to-end business processes are not well documented. It is important to understand the "as is" state when defining the desired future state.
- "Target state" enterprise process boundaries are unclear.
- Success requires explicit senior management's continuous endorsement.
- ConOps document is an iterative process, not a static document. Routine maintenance will be required.

Metric

The ConOps will be approved and integrated with the overall Enterprise Architecture and Agency IT Portfolio Management processes. OCIO will accomplish and document such integration and will provide such documentation to OPII for purposes of monitoring progress against this Plan.

INITIATIVE F2 Business System Gap Analysis

Focus Areas: Management of Financial Management Systems

Lead Executive: Jonathan Pettus, Chief Information Officer

Supporting Organization(s): Representative projects including HyBolt, Orion, GOES-N, International Space Station, James Webb Space Telescope, Management/Business System Integration Group.

Description
Perform a Gap Analysis to identify and characterize where NASA's business and management systems are not meeting the information needs of the Project Management community Agency-wide.

- The scope of the Gap Analysis is to identify and characterize where NASA's business and management systems are not meeting the information needs of the Agency.
- The depth of the Gap Analysis includes gaps associated with the data, processes, applications, and the human aspects of the associated systems.

Expected Outcomes
The Gap Analysis will identify how well the Agency's management and business systems are meeting the needs, goals, and objectives of the project management community. Gaps will be subsequently assessed and prioritized for future system modifications.

Accomplishments

January 2007	Acting Integration Manager assigned
January 2007	Management/Business Systems Integration Group chartered
February 2007	Plan for conducting data gap analysis completed
March 2007	Received Authority to Proceed
April 2007	Representative projects identified
May 2007	Gap Analysis Team identified and trained
July 2007	Gap identification completed
October 2007	Prioritize project management business system gaps, along with other identified Agency business system gaps. January 2008 Update: The initial due date for this milestone was January 2008, and the activity was completed in October 2007.

Actions Required to Complete

November 2008	Submit business system enhancement proposal(s) to the FY 2011 budget process

Impediments/Challenges

- Data gaps will be defined by a set of representative projects. Collectively, these projects must represent the NASA portfolio.
- Knowledgeable project team members must be available to support the gap-identification process.

- Several projects are large and have geographically dispersed teams; therefore, adequately identifying all needs, given the depth and breadth of the representative projects, may be difficult.
- It is important to not only identify the needs of the customers but also determine supplier gaps that may impede the supplier's ability to support the customer.
- Focus of gap analysis on project management needs may not uncover mission support gaps.
- Results of this gap-identification activity will be incorporated into a pool that includes mission support organizations. The prioritization process will be accomplished by the M/BSIG. Top priorities may or may not be scheduled for immediate implementation, depending on funding and resource availability.

Metric

The Agency will maintain an annual prioritized list of its top five business system gaps. Creating and maintaining such a list will constitute a successful outcome of this initiative. OCIO will provide the annual list to OPII for purposes of monitoring progress against this Plan. January 2008 Update: Corrective actions are currently being developed for the gaps that were prioritized in October 2007. This metric is on track.

Appendix G

PROCUREMENT PROCESSES AND POLICIES

Focus Area: Standard Business Processes

Lead Executive: William McNally, Assistant Administrator for Procurement

Supporting Organization(s): OCIO/IEMP, Mission Directorates, and Center representatives

Description
A number of improvements have recently been made to various procurement processes and policies; others are in progress. The following six specific improvements are noted in this Plan because they are relevant to its goals and objectives and will serve to strengthen Agency performance with regard to contract management.

- **Deployment of an Agency-wide standard contract writing application**
  In order to standardize procurement practices across the Agency, the Office of Procurement and IEMP deployed the Contract Management Module (CMM) Agency-wide in November 2006. CMM is a comprehensive integrated tool which interfaces with NASA's core financial system and supports contract/grant writing, limited contract/grant administration, procurement workload management, and data reporting/management for NASA. As any new system involves continuous process improvement, the implementation continues to be supported with regularly scheduled Center management and user meetings. Since deployment, IEMP, the Office of Procurement, and the Centers have focused on stabilizing the system and the underlying business processes. Those efforts have proven successful as the number of Help Desk calls and service/enhancement requests have declined. Data collected before the system was stabilized would not have proven useful in determining the degree of procurement process standardization being driven by the tool; therefore, a decision was made to delay data collection until the next version release of CMM. A more detailed discussion of planned metric collection and usage is provided at the end of this section.
  The use of CMM will bring more commonality to contract structures and provisions, including project management mechanisms addressed elsewhere in this Plan, such as cost-reporting requirements. The numerous procurement processes standardized across the Agency by CMM include--
  - Receipt of Purchase Request and Commitments (PRC)
  - Solicitation formulation
  - Solicitation amendment
  - Contractor Representations and Certifications
  - Preaward contractor screening
  - Contract formation
  - Contract modification

- Delivery/Task Order issuance
- Termination, and
- Contract closeout.

- **Establishment of Earned Value Management (EVM) procurement policy**
  Effective and appropriate use of EVM will be key to improving NASA contract management. This Plan's initiatives address EVM training, the application of EVM in tracking project performance, and optimization of EVM reporting among the suite of contract cost-reporting tools. NASA has a designated Program Executive for EVM (PE/EVM) in the Office of the Chief Engineer who manages and coordinates all EVM policy issues and ensures that EVM training is available as needed for program/project management personnel. The PE/EVM also leads a working group that includes the EVM lead at each NASA Center, representatives from the Mission Directorates, and select Mission Support Offices, as required. Center leads also provide real time EVM guidance and advice to managers at the project level. NASA procurement regulations were recently revised, specifically to support and enable use of EVM. As a result, the NASA FAR Supplement (NFS) now provides the following information:
  - Dollar-value thresholds for EVM, i.e., $20 million for use of Earned Value Management System (EVMS) and $50 million for requiring EVMS recognition
  - The Defense Contract Management Agency (DCMA) will be consulted in determining the adequacy of proposed EVMS plans
  - Clear guidance that the use of preaward Integrated Baseline Reviews (IBR) is limited to the second or subsequent phases of a phased acquisition (see NFS 1817.73). When a preaward IBR is contemplated, the contracting officer shall include the instructions with respect to the schedule and conduct of the IBR in the proposal request.
  - EVM is not required on contracts for nondevelopmental engineering support services, steady state operations, basic and applied research, and routine services such as janitorial services or grounds maintenance services. In these cases, application of EVM is at the discretion of the program/project manager.

  As a result of the revised NFS guidance, Procurement Strategy Meetings now reflect the planned inclusion of EVM requirements when applicable. Training on effective and appropriate EVM use has been emphasized by providing a presentation on contract EVM requirements at the most recent Agency-wide Procurement Training Conference, and an EVM instruction module has been included in the senior-level procurement training course (CON 353) provided to NASA procurement personnel. NASA assesses Center compliance with all levels of procurement policy guidance (Federal, Agency, and Center) through the Office of Procurement's survey and self-assessment program. This program validates Center compliance with policy guidance, tracks Center implementation of key Agency initiatives, identifies best practices for potential Agency-wide implementation, and seeks to identify potential systemic weaknesses. Survey findings are presented to Center and Agency leadership, and final reports are

posted to the NASA Procurement Library for Agency-wide distribution. Center self-assessments are conducted semiannually, and the results are submitted to the Assistant Administrator for Procurement.

- **Clarification of policy with respect to the acquisition of services**
  NASA purchase and management of contracted services is an area in which the Agency has lacked a common approach. Multiple NASA Centers have inconsistently implemented the services acquisition policy in various parts of the FAR (e.g., 7.3, 7.5, 37.1) and OMB Circular A-76 on issues such as personal services, service contracting (especially advisory and assistance services), and commercial activities. Absent clear explanation of the policy, there was a risk of improperly structuring, awarding, and managing contracts for services. In the interest of cross-Agency standardization, the Office of Procurement addressed this risk by issuing Procurement Information Circular (PIC) 07-02 in February 2007. The PIC provides a one-stop, clearly organized job aid that explains statutory, regulatory, and Agency policy regarding the acquisition of services and sets forth the documentation requirements necessary to appropriately comply with policy guidance. Policy related to the acquisition of services will be further enhanced by a revision to NASA Form 1707, Certifications and Special Approvals for IFM Purchase Requisitions. The revised form will include a new section on the acquisition of services to ensure that key considerations are made prior to releasing any solicitation. This revision is discussed in greater detail in the section below titled "Strengthening of the purchase request coordination process." NASA assesses Center compliance with procurement policy guidance through the Office of Procurement's survey and self-assessment program.

- **Policy improvements to acquisition strategy planning**
  NASA's new approach to Agency strategic acquisition is addressed in a separate initiative of this Plan. The Office of Procurement has issued associated changes to Agency procurement policy. The Acquisition Strategy Meeting (ASM) that was described in NFS 1807.170 has been retitled Procurement Strategy Meeting (PSM) as part of a revision in the NASA planning process into three significant and discrete events: Acquisition Strategic Planning (ASP), Acquisition Strategy Meeting (ASM), and the PSM. The ASP and the ASM occur during the program and project approval and requirements development processes. The ASP is used to approve programs and significant projects for execution. The ASM is program or project specific, more detailed than the ASP, and addresses questions such as risk, budget, schedule, and requirements. The PSM is project or contract specific and is developed by the project manager, supported by the contracting officer, and approved as prescribed in the NFS.

- **Award Fee cost benefit analyses**
  NASA frequently issues cost-plus-award-fee contracts, in which the award fee process plays a key role in contract management. However, award fee contracts are not always appropriate, and NASA procurement offices have not documented the cost-benefit analysis that supports use of an award fee incentive. This analysis

demonstrates that the administrative costs associated with managing the award fee are outweighed by the expected benefits. In addition, award fee evaluation criteria have not always been linked to desired performance outcomes. The NFS was revised with the issuance of Procurement Notice (PN) 04-27, dated June 29, 2007. The NFS now requires the documentation of a cost-benefit analysis and the use of evaluation factors that relate directly to outcomes. Compliance with PN 04-27 is assessed through the Office of Procurement's survey and self-assessment program. The Procurement management survey and self-assessment guides were revised in September 2007 to incorporate assessment questions targeting the effective use of award-fee contracts. These improvements will provide more effective contract management.

- **Strengthening of the purchase request coordination process.**
  When structuring contracts and modifications, Contracting Officers must obtain and abide by the recommendations of a cross-functional procurement team, including technical and functional experts. Such a team can best identify the optimal set of contract management requirements and tools for the contract document. Within the NASA IEMP automated environment, the requisition documentation is the method by which the members of the procurement team identify and document recommendations. However, at this point, requisition documents and electronic records do not always contain evidence of all the necessary presolicitation reviews, comments, and approvals. To ensure compliance and further standardization in this area, NASA is currently updating its Form 1707, as previously cited. This checklist-style form, which is required for all contract awards, is used to document presolicitation routing, approval, and action. Additions are being made to include sections addressing review and approval for service contracts and facility security contract requirements, and the existing section on quality assurance is being clarified.

Expected Outcomes

The expected outcomes and value thereof have been noted within each of the preceding six descriptions and are summarized below:

- Greater standardization in the form and structure of NASA contracts.
- Improved visibility into contract performance.
- Improved planning in the development of contracts for services.
- Reduced risk of key decisions not receiving appropriate management review.
- Increased compliance with Agency award-fee policy and appropriate use of these incentives.
- Reduced risk of key requirements being omitted from NASA contracts.

Accomplishments

August 2006	Completed policy improvements to acquisition strategy planning
October 2006	Deployed Agency-wide standard contract writing application
November 2006	Issued EVM procurement policy
February 2007	Completed clarification of policy regarding acquisition of services
June 2007	Completed award fee policy revisions

August 2007	Reviewed and clarified requirements for improvement of the purchase request process
November 2007	Completed processing revision to the purchase request form through NASA forms control. This milestone is completed.

Actions Required to Complete
January 2008 Update: All milestones under this initiative have been completed.

Impediments/Challenges
None

Metric
Standardization of procurement processes through the new automated CMM depends on full utilization of the tool. In order to monitor Center personnel's migration to the tool, NASA anticipates establishing a metric to track the percentage of documents built within the CMM PRISM software, including information by NASA Center and other attributes considered appropriate, after the next version release in FY 2008. The Office of Procurement will develop and maintain the metric and will provide the resultant data to OPII periodically for purposes of monitoring progress against this Plan.
January 2008 Update: the procurement team is currently evaluating the feasibility of building this metric (as well as other metrics) into a future release of CMM. Once feasibility has been assessed, the process will continue to the funding prioritization step. While working toward the system change that this metric would require, the team notes that a very high percentage of obligations in the Core Financial module now have corresponding records in CMM – this attests to the utilization of CMM at the Centers, and may be explored as a more easily obtainable metric. Additionally, the usage of CMM is now being assessed during each of Headquarters' periodic management surveys of Center procurement operations.