

## **ADDRESSING MANAGEMENT CHALLENGES AND IMPROVING PERFORMANCE**

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An essential phase in NASA's performance management cycle is to evaluate Agency performance against its plans. Managers assess performance throughout the year and pay particular attention when NASA's performance falls short of its goals. They seek explanations, develop plans to improve performance, and track results for as long as necessary. NASA leadership also evaluates trends across the portfolio of programs and over longer periods of time to identify and resolve persistent issues.

The Government Performance and Results Act Modernization Act of 2010 reinforced NASA's approach to performance management by introducing requirements for unmet program performance. Specifically, Congress required agencies and the Office of Management and Budget to provide analysis of trends in unmet performance targets. When a NASA program does not meet its commitment as stated in the annual performance plan, responsible program officials must explain the performance shortfall and provide an improvement plan for correcting the issue. This section provides the explanations and performance improvement plans for any unmet performance measures in FY 2012 and, where applicable, the link to the prior year's performance. For FY 2012, NASA discusses performance trends in the following categories:

- Cost and Schedule Performance,
- Commercial Spaceflight Development, and
- Diversity.

To provide better performance improvement plans, NASA assesses the explanations for unmet performance and looks for trends in root causes. The results of this root cause analysis inform senior management when crosscutting corrective actions are warranted. In addition, NASA uses information on management and performance challenges, as identified by NASA's Office of Inspector General (OIG) and the Government Accountability Office (GAO), to better understand root causes and to guide setting improvement plans.

# ADDRESSING MANAGEMENT CHALLENGES AND IMPROVING PERFORMANCE

## Addressing Management Challenges

The Agency relies on internal and external evaluations of its policies and performance to improve performance management. Three such external evaluations deliver valuable insight into areas for improvement:

- The GAO High Risk Series;
- GAO’s Major Management Challenges and Program Risks, also referenced as the Management and Performance Series; and
- OIG’s annual Letter on NASA’s Top Management and Performance Challenges.

While the individual GAO and OIG reports provide a snapshot of the challenges at one- to two-year intervals, NASA examined the topics highlighted in the reports over a longer timeframe for additional insight. NASA looked for trends in the GAO reports over a 20-year span and in the OIG reports a 12-year span (see Figure 3.1).

**Figure 3.1: Trends in GAO High Risk and OIG Management Challenges, 1991-2012**

Report Year	1991/1992	1993/1994	1995/1996	1997/1998	1999/2000	2001/2002	2003/2004	2005/2006	2007/2008	2009/2010	2011/2012
Financial Management	▲	▲	▲	▲	▲ ■	▲ ■	▲ ■	▲ ■	▲ ■	■	
Contract Management	▲	▲	▲	▲	▲ ■	▲ ■	▲ ■	▲ ■	▲ ■	▲ ■	▲ ■
Program and Project Management/Cost and Schedule Performance	▲	▲	▲	▲	▲ ■	▲ ■	▲	▲ ■	▲ ■	▲ ■	▲ ■
IT Governance and Security					■	■	■	■	■	■	■
Infrastructure and Facilities Management	▲	▲		▲			■		▲	■	■
Human Capital Management				▲		▲	▲	■	■	■	
Human Spaceflight Transition and Future								■	■	■	■
Safety and Mission Assurance					■	■	■	■	■		

Legend: ▲ – GAO High Risk/Major Management Challenges  
 ■ – OIG Management Challenges

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NASA identified eight categories where GAO and OIG predominately highlighted challenges. The primary categories of interest to both sets of evaluators center on NASA's financial management, contract management, and program and project management, particularly in the area of cost and schedule estimation. In each of these categories, NASA has made significant progress at addressing the weaknesses as outlined by GAO and OIG, as discussed below.

### **FINANCIAL MANAGEMENT**

NASA has made significant improvements to the integrity of its financial management systems, processes, and reports. In the early 1990s, GAO reported that NASA was not in compliance with the Chief Financial Officers Act of 1990 requirements for a single integrated financial management system, and had accounting systems that were costly and outdated. NASA accelerated its efforts to develop an integrated system, but experienced delays in development, along with financial controls and reporting challenges along the way. The Agency continued to address each of these challenges and overcame them in FY 2011 to achieve an unqualified audit opinion. In FY 2012, NASA focused on maintaining the unqualified opinion while improving efficiencies and reducing costs. For example, NASA reduced administrative spending on travel, printing, supplies, and advisory services. These savings, which are associated with the Administration's management agenda to "Promote Efficient Spending," enabled the Agency to increase funding for research and development contracts, facilities enhancements, and grants.

### **CONTRACT MANAGEMENT**

NASA contracts over 80 percent of its budget to acquire goods and services. Hence, the Agency has invested a significant effort in developing robust processes and procedures that ensure a strategic approach to acquisition planning and contract management. The Agency continues to address challenges in acquisition management and to build on these processes and procedures. For example, NASA continues to improve its earned value management capabilities, which started with initial codification of contract management policies in 1999, and now includes an expansion of requirements to measure performance of in-house efforts. These improvements will provide a holistic picture of the Agency's projects, which include both contractor and civil servant work. NASA also instituted senior leadership forums to ensure that contracting approaches are reviewed as part of the Agency acquisition process, and that acquisition decisions are integrated with budget and strategic planning. NASA will continue efforts to improve contract management, and is revisiting the measures that are currently within the annual performance plan to further characterize and monitor progress in areas of challenge.

The third area of interest, program and project management, particularly in the area of cost and schedule estimation, is discussed in the "Highlighted Performance Trends" section.

### **OTHER CATEGORIES**

NASA remains diligent in addressing any current challenges in the other five categories of interest: human capital management, infrastructure and facilities management, safety and mission assurance, human spaceflight transition and future directions, and information technology governance and security. Below is a brief discussion of the status of these categories.

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### **Human Capital Management**

When GAO identified human capital management as a high-risk area, their concern was that Federal agencies were not strategically planning for their human capital needs. NASA has been off GAO's list since 2003/2004. Beginning in 2005/2006, OIG also identified Shuttle and Constellation workforce transition as a management challenge. To help with transition, OHCM provided a range of tools and assistance to civil servants and contractors, including job seeking training sessions, career counseling, retention pay, and workforce sharing. OIG removed Shuttle and Constellation workforce transition as a management challenge as of 2011/2012. In 2011, NASA's Office of Human Capital Management (OHCM) released its Workforce Plan, which ensures that OHCM's priorities are aligned with NASA's future directions.

### **Infrastructure and Facilities Management**

For years, GAO and OIG have highlighted issues with aging and underutilized infrastructure at NASA, including the scheduling and funding of facilities maintenance and repair, and NASA continues to address these issues. In 2011, NASA began developing its first integrated, Agency-wide real property Master Plan. NASA intends to use the Plan to coordinate resources across the Agency, link real property needs with projected funding to support NASA programs and strategic objectives, and gain efficiencies by eliminating facilities that no longer benefit the Agency. The development of an Agency-wide Master Plan is the result of NASA's efforts to revise its facility strategy to reduce the Agency's infrastructure footprint. In response to the NASA Authorization Act of 2010, NASA prepared a strategy document that describes the facilities renewal approach adopted in 2009 by the Agency, known as the "similar/smaller strategy," with a goal to reduce each Center's current replacement value by 10 percent by 2020 and 15 percent by 2050. NASA continues efforts to identify and reduce the Agency's unneeded and duplicative research and development facilities.

### **Safety and Mission Assurance**

In 2003, OIG reported the Space Shuttle as a material weakness after the Columbia accident on February 1, 2003, and identified a range of safety and management assurance management challenges that would hinder return to flight. NASA corrected these issues in 2005. As NASA worked to complete ISS and retire the Shuttle fleet, OIG noted the additional risks to people, equipment, and mission that would result from the associated schedule pressures, technical challenges, and budgetary constraints. OIG removed this area as a management challenge two years before NASA safely flew out the Shuttle manifest and retired the fleet.

### **Human Spaceflight Transition and Future Directions**

Over the past four years, this category has included retiring the Shuttle fleet, utilizing ISS safely, obtaining commercial cargo and crew services to low Earth orbit, and developing the next-generation Space Launch System (SLS). In FY 2011, NASA flew the last Shuttle mission, delivering the last major ISS component, and retired the fleet, one year later than the planned target. NASA's focus is now on fully utilizing ISS. A significant factor in achieving this is the amount of time the crew can commit to research. NASA has increased average crew research time from 23.9 hours per week in 2010 to 35 hours per week in 2012.

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The need for domestic access to space places has placed emphasis on NASA's support for commercial space services. In FY 2012, the Commercial Orbital Transportation Services Program partner SpaceX conducted a demonstration flight to ISS and its first resupply mission. NASA continues to tackle the challenges of developing requirements and certifying vehicles, particularly for commercial crew transportation services. Additionally, NASA continues to develop new spaceflight capabilities to move beyond low Earth orbit, through the development of SLS and the Multi-Purpose Crew Vehicle (MPCV), expected to have their first uncrewed demonstration in 2017. As these systems successfully develop, NASA expects that this management challenges area will be retired.

### **Information Technology Governance and Security**

Over the past five years, OIG issued 21 audit reports containing 69 IT-related recommendations. OIG investigators conducted more than 16 separate investigations of breaches to NASA networks, several of which resulted in the arrests of foreign nationals. To improve the Agency's capability to detect and respond to cyber attacks and unauthorized access to its computers, in November 2008 NASA created a single, Agency-wide computer security incident response capability. An August 2012 OIG audit determined that this was providing an effective system for managing and reporting most IT security incidents. In FY 2012, NASA's IT security program began providing full-disk encryption on notebook computers and other mobile computing devices distributed to employees, with the target of Agency-wide protection by March 31, 2013. The audit also provided recommendations for enhancing NASA's detection and prevention capabilities, and the Agency is in the process of implementing these recommendations. NASA will continue to show improvements into the future in this area.

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### **Highlighted Performance Trend: Cost and Schedule Performance**

#### **COST AND SCHEDULE CHANGES TO PROJECT BASELINES: PERFORMANCE IMPROVEMENTS SEEN**

This section provides a detailed look at the cost and schedule performance of NASA's programs and projects, as demonstrated in the FY 2013 Major Program Annual Report (MPAR), which only includes projects in development with a lifecycle cost baseline of \$250 million or more, and through annual performance goals in the FY 2012 Agency Performance Report. It discusses progress and corrective actions that NASA has taken in response to growth in both cost and schedule baselines. NASA also provides evidence of improvement, demonstrating that Agency policies lead to cost and schedule performance that meets Agency commitments across its portfolio.

#### **Taking Corrective Actions Has Led to Performance Improvements**

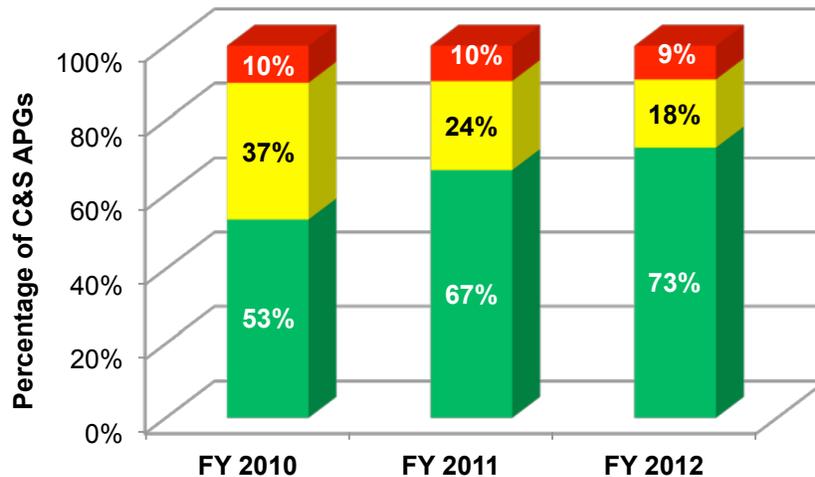
In the last five years, NASA fundamentally transformed how it manages its programs and projects, acquisition strategies, and procurements. This included strengthening program and project management, establishing more rigorous cost estimation practices, and revising procurement practices and systems. These efforts are now yielding demonstrated results for projects that were initiated under the new policies four to five years ago and have completed development in the last one to two years.

#### **Trends in Annual Performance Goals Reflect Improvements**

NASA established annual performance goals to measure cost and schedule performance. For example, the Agency created several measures that track completion of development projects to 10 percent over their cost and schedule baseline. Exceeding this threshold results in a rating other than Green. Figure 3.2 shows that over the last three fiscal years the number of cost and schedule annual performance goals (APGs) rated Yellow or Red has decreased, both in actual numbers and as a portion of the total number of APGs.

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Figure 3.2: Cost & Schedule APGs by Rating, FY 2010-FY 2012<sup>1</sup>



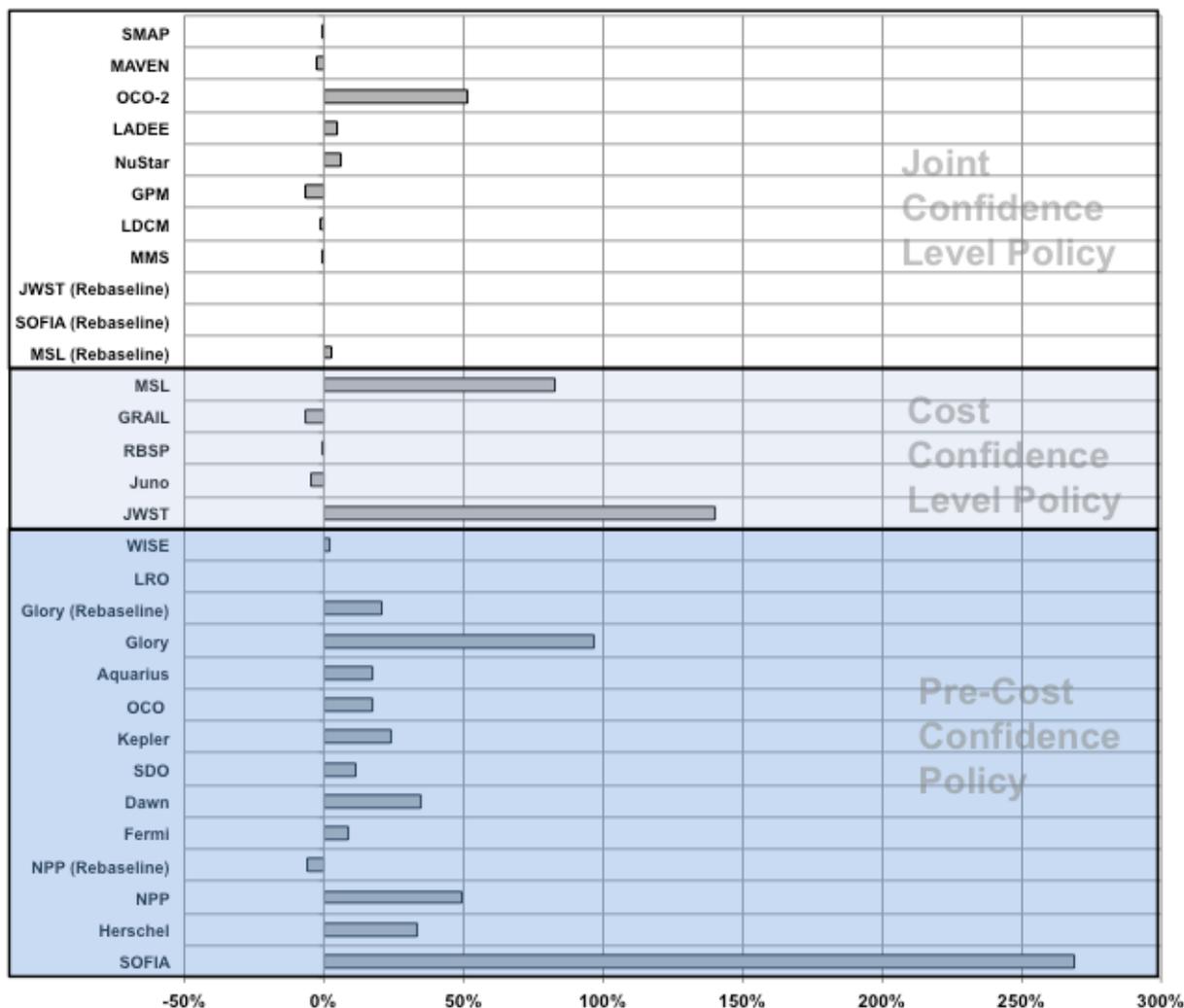
### Changes to Cost and Schedule Estimating Policy Strengthened Performance

The Joint Confidence Level (JCL) policy has improved cost performance of NASA projects. NASA demonstrates the effectiveness of the new JCL policy by comparing the cost performance of projects confirmed using a JCL to projects confirmed under previous Agency policies, such as the Cost Confidence Level and Pre-Cost Confidence policies. Figure 3.3 shows that there is less variation from the estimated development cost baseline as NASA refined and implemented acquisition policies.

<sup>1</sup> NASA revised the rating for OSIRIS-REx from White to Yellow after the Congressional Justification was printed. Therefore, this chart is different from the printed version.

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Figure 3.3: Cost Performance of NASA Projects Versus Cost and Schedule Estimating Policies<sup>2</sup>



Since mid-2011, six NASA missions (Juno, GRAIL, NPP, MSL, Van Allen Probes (formerly known as RBSP), and LDCM) launched without experiencing significant development cost growth from their Agency baseline commitments. All except NPP and MSL were launched under their original baseline budget. NASA confirmed NPP and MSL prior to many of the current program management improvements; adoption of these management practices as part of their rebaseline stabilized their cost performance.

<sup>2</sup> NASA rebaselined the development costs of the NPP, Glory, MSL, SOFIA, and JWST projects. Figure 3.3 provides the cost changes from both the rebaseline and the original baseline, set at Key Decision Point-C. As reported in NASA's FY 2013 Congressional Budget Justification, due to a second Taurus-XL launch vehicle failure, NASA delayed the source selection and launch services preparations, integration, and testing for the OCO-2 project, resulting in a schedule delay and additional cost.

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Six space missions that remain in development are below the Congressionally prescribed fifteen percent cost threshold and six-month schedule threshold from their confirmation or rebaselined cost numbers; IRIS, LADEE, MAVEN, GPM, MMS, and JWST. OCO-2 is the single mission in development that has experienced cost growth since the FY 2013 Congressional Justification. The cost growth is due to selection of a more expensive and reliable launch vehicle, a NASA-directed change following two consecutive launch vehicle failures. While risks remain for all projects yet to launch, overall cost performance has prevented budgetary disruptions to other projects.

### **A History of Corrective Actions to Improve Cost and Schedule Performance**

NASA's spaceflight projects are generally complex missions that require cutting edge scientific research and technology development. To effectively manage these acquisitions, NASA requires the integration of fundamental program and project management tools and sound acquisition practices. Ineffective project planning and controls can impact NASA's ability to understand and address challenges in a manner that either recognizes or mitigates cost and schedule growth. Specifically, effective lifecycle cost and schedule management requires:

- Instituting good lifecycle cost-estimating policy and processes (set good baselines);
- Instituting tracking and trending methodologies and using "best practice" tools to predict lifecycle estimate changes (proactively mitigate drift from and violation of the baseline);
- Establishing effective risk identification and planning for the costs to mitigate and deal with risks if they manifest (manage threats to lifecycle cost/schedule changes);
- Establishing clear reporting requirements and responsibilities (ensure accountability); and
- Making budget planning and allocation decisions based on lifecycle cost and schedule estimates and the performance toward these (ensure alignment of funding needs to lifecycle needs).

Since 2007, NASA has improved program and project management, lifecycle cost estimation, and procurement practices to address challenges in acquisition management. The Agency uses the information on management and performance challenges, including reports from the NASA OIG and GAO, to help guide these actions. Notable corrective actions include:

- Implementing new cost and schedule analysis and estimation processes, beginning with the Cost Analysis Data Requirement in 2005. In 2009, NASA introduced the use of an integrated probabilistic assessment of cost and schedule estimates, yielding a JCL;
- Revising Agency policy to identify and mitigate risks early in the formulation phase of a project to improve performance during the implementation phase, including establishment of the Formulation Agreement, development of Maturity Matrices, and a requirement to baseline some products earlier in the life cycle;
- Establishing a pilot program to address leading technical indicators to assess a project's maturity;
- Developing and implementing NASA Policy Directive 1000.5A, "Policy for NASA Acquisition," in 2008 to provide a framework to link budget decisions to achieving specified confidence levels for lifecycle cost and schedule baselines;
- Instituting senior leadership forums to ensure the Agency acquisition process is integrated with budget and strategic planning. These forums are the Strategic Implementation Planning meeting

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and the Acquisition Strategy Meeting, as well as the redefined existing Procurement Strategy Meeting; and,

- Improving NASA's earned value management capabilities.

Two of the corrective actions are discussed in more detail below.

### **Improvements to Cost and Schedule Estimating Policy**

Estimating cost and schedule baselines for NASA projects is complex and challenging. NASA must account for risks introduced by many factors. Factors in the industrial base include launch vehicle availability, vendor capabilities, and counterfeit parts. Long development cycles can be affected by factors such as instability of funding, delays in funding, or a misalignment of resources and schedules. Acquisition management introduces additional risk factors, such as protests on a vendor award, to project cost and schedule baselines. Ineffective project planning and controls can impact the ability to understand these factors and to address them in a manner that mitigates cost and schedule growth. Project risks, if realized, can contribute to cost and schedule growth.

In January 2009, NASA strengthened estimation practices by adopting a new acquisition strategy policy, which improves the Agency's ability to manage performance risk. The new policy requires space flight projects and programs to develop JCLs that address both cost and schedule risks. A JCL builds on traditional cost and schedule estimating practices by providing a probability that a project will meet its cost and schedule targets. The policy requires a JCL to inform NASA's baseline commitments. As NASA has become more experienced in using JCLs, it is modifying its processes to utilize this management tool for projects with lifecycle costs greater than \$150 million (currently, only projects with lifecycle costs of \$250 million or more are required develop JCLs as part of their management strategy). Additionally, the policy requires separate probabilistic range estimates for cost and schedule at an early key decision point to support adequate long-term budget planning.

### **Mitigating Risks in the Project Formulation Phase**

During the formulation phase, key decisions are made that will affect a project through development and operations. NASA is mitigating risks during the formulation phase by formalizing project parameters and addressing technical maturity. NASA is revising its policy to require a formulation agreement, which ensures stakeholders have a clear understanding of the work to be performed with associated cost and schedule requirements. Such an agreement was not typically required until a project entered the development phase.

Additionally, NASA has focused on adequate technical maturity, not only in support of preliminary design reviews, but also throughout the life cycle. The Agency recognizes that sufficient technical maturity is essential to improve cost estimation during the formulation phase and to set robust cost and schedule baselines for the development phase.

In response to direction regarding "Cost Control" in House Report 112-169, accompanying the NASA FY 2012 appropriation (H.R. 2596), NASA is codifying an approach to ensure appropriate technical maturity in NASA's program and project management policies in the NASA Procedural Requirements (NPR) 7123, "NASA Systems Engineering Processes and Requirements." Specifically, the Agency

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created a set of “Maturity Matrices” that clarify expected design maturity objectives at lifecycle reviews and key decision points. NASA has established and is piloting a set of technical leading indicators for both the preliminary design review and the critical design review to enhance leadership’s understanding of the project’s maturity. Finally, NASA currently is developing a common set of programmatic and technical indicators to support trending analysis of the design maturity throughout the life cycle. NASA included the indicators in the Program and Project Plan templates found in the appendix of NPR 7120.5, “NASA Space Flight Program and Project Management Requirements.”

### **FY 2012 COST AND SCHEDULE PERFORMANCE DETAILS AND TRENDS**

#### **2013 Major Program Annual Report Summary**

The 2013 MPAR is provided to meet the requirements of section 103 of the NASA Authorization Act of 2005 (P.L. 109-155; 42 U.S.C. 16613). The 2013 MPAR consists of this summary and FY 2014 Congressional Justification pages designated as “Projects in Development,” for the projects outlined below. These project pages constitute each project’s annual report, or if this is the first year for which it is in reporting, the baseline report. The MPAR summary also includes the confidence level of achieving the commitments as requested in the Conference Report accompanying the FY 2010 Consolidated Appropriations Act (P.L. 111-117). As required by section 1203 of NASA 2010 Authorization Act (P.L. 111-267; 42 U.S.C. 18301), the corrective action plans for GPM, OCO-2, JWST and SOFIA can be found in the respective project pages in the FY 2014 Congressional Justification.

#### **Changes in MPAR Composition since the FY 2013 NASA Budget Estimates**

Two new projects with estimated lifecycle costs greater than \$250 million received authority to proceed into the development phase since NASA submitted its 2012 MPAR in the FY 2013 NASA Congressional Justification:

- ICESat-2, with a baseline development cost of \$558.9 million at a joint confidence level of 70 percent; and
- SMAP, with a baseline development cost of \$485.7 million and a greater than 70 percent joint confidence level.

The 2012 MPAR in the FY 2013 NASA Congressional Justification included two projects that are no longer in MPAR reporting. NASA successfully launched the Van Allen Probes (formerly known as RBSP) spacecraft on August 30, 2012, and the LDCM spacecraft on February 11, 2013. NASA launched the Van Allen Probes within three months of the project baseline launch date and below the baseline development cost. NASA launched LDCM four months before the project baseline launch date and below the baseline development cost.

There are no other changes to the MPAR composition to report. Refer to Figure 3.4 for the full list of reportable projects.

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### Changes in Cost and Schedule Estimates from the 2012 MPAR

No projects exceeded a cost or schedule threshold since the 2012 MPAR. This report includes updates to the OCO-2 project cost and schedule, previously reported as “under review” due to uncertainty regarding which launch vehicle NASA would use for the mission. NASA completed the threshold reporting requirements for the GPM project, which resulted from the project’s schedule delay, and submitted the reports to the White House and appropriate Congressional committees.

### MPAR Summary Table

Figure 3.4 provides cost, schedule, and confidence level information for NASA projects currently in development with lifecycle cost estimates of \$250 million or more. NASA records the estimated development cost and a key schedule milestone and then measures changes from them. NASA tracks one of several key milestones, listed below, for reporting purposes:

- Launch Readiness Date (LRD);
- Full Operational Capability (FOC); or
- Initial Operating Capability (IOC).

As a note for clarification, LRDs are not typically the launch dates on the NASA launch manifest, but are the desired launch dates as determined by the payload mission and approved by the NASA Flight Planning Board (FPB). A launch manifest is a dynamic schedule that is affected by real world operational activities conducted by NASA and multiple other entities. It reflects the results of a complex process that requires the coordination and cooperation by multiple users for the use of launch range and launch contractor assets. The launch dates shown on the NASA FPB launch manifest are a mixture of confirmed range dates for missions launching within approximately six months and contractual/planning dates for the missions beyond six months from launch. The NASA FPB launch manifest date is typically earlier than the reported schedule date, thereby allowing for the operationally driven fluctuations to the launch schedule that may be outside of the Project’s control. The NASA FPB launch manifest is updated on a periodic basis throughout the year.

The confidence level (CL) estimates reflect an evolving process as NASA improves its probabilistic estimation techniques and processes. Each estimate reflects the practices and policies at the time it was developed. Estimates that include combined cost and schedule risks are denoted as Joint Confidence Level (JCL) estimates; all other CLs reflect cost confidence without necessarily factoring the potential impacts of schedule changes on cost.

Additional explanations for the data in the summary table are provided here:

- The joint confidence level percentage for GPM reflects the KDP-C Replan JCL, approved in October 2011.
- The FY 2013 Congressional Justification established the JWST rebaseline, which is reflected in the table below. JWST’s MPAR Cost Estimate includes Construction of Facilities funds.
- For MMS, the confidence level estimates include the partners’ contributions, while the development cost reflects only the NASA portion of project costs.

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- MAVEN’s JCL included schedule risk of the launch vehicle but used the Headquarters-provided launch vehicle cost as a pass-through number per agreement with the Standing Review Board (SRB).
- The current year development cost and key milestone date for OCO-2 would become the new project baseline after Congressional reauthorization pursuant to sec. 103 of P.L. 109-155. The JCL was performed for Phases C and D, excluding project managed unallocated future expenses, JPL fees, launch services, and low-level fixed cost activities at GSFC.
- The confidence level estimate performed for TDRS K/L addresses the full partner contribution, while the development cost reflects only the NASA portion of project costs. The current baseline costs are solely for TDRS K/L.

Additional information on the projects shown in the table below can be found in their individual program and project pages in the main body of the Congressional Justification.

**Figure 3.4: MPAR Summary and Confidence Levels**

Project	Base Year	JCL (%)	Development Cost Estimated (\$M)		Cost Change (%)	Key Milestone	Key Milestone		Schedule Change (months)
			Base	2013			Base	2013	
GPM	2010	70	555.2	509.3	-8.3	LRD	Jul 2013	Jun 2014	11
ICESat-2	2013	70	558.9	556.5	-0.4	LRD	May 2017	May 2017	0
JWST	2012	66	6,197.9	6,190.4	-0.1	LRD	Oct 2018	Oct 2018	0
LADEE	2011	70	168.2	176.1	4.7	LRD	Nov 2013	Nov 2013	0
MAVEN	2011	70	567.2	550.5	-3.0	LRD	Nov 2013	Nov 2013	0
MMS	2010	70	857.3	856.8	-0.1	LRD	Mar2015	Mar 2015	0
OCO-2	2011	70	249.0	371.6	49.2	LRD	Feb 2013	Feb 2015	24
SMAP	2013	>70	485.7	484.8	-0.2	LRD	Mar 2015	Mar2015	0
SOFIA	2007	70	919.5	1,127.8	22.7	FOC	Dec 2013	Dec 2014	12
TDRS K/L	2010	75 (CL)	209.4	184.6	-11.8	LRD	K: Dec 2012	K: Jan 2013	1
							L: Dec 2013	L: Feb 2014	2

### COST AND SCHEDULE ANNUAL PERFORMANCE GOALS

NASA reviewed its annual performance measures where performance fell short due to cost and schedule issues. In FY 2010, 14 APGs indicated cost or schedule growth in NASA’s projects. In FY 2011, there were seven. As of FY 2012, there were only five such APGs. Root causes presented in these tables include development partner challenges, vendor quality parts and processes, launch vehicles, funding instability, program planning and control, and acquisition management.

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<b>10IT11</b>	
<b>Accountable Organization: Office of the Chief Information Officer</b>	
Complete all development projects within 110% of the cost and schedule baseline.	<b>FY 2010 Red</b>
<i><b>Why Measure 10IT11 Was Not Met:</b></i> All but one project finished within the required 110 percent of cost and schedule baselines. The Security Operations Center (SOC) implementation (Phase-2) project has undergone schedule slips, due to delays in facilities power modifications resulting in delays of receiving IT Security event data from numerous sources across the Agency. The delay in having adequate power to the facility kept the SOC from being able to capture data, thereby not allowing testing and not being ready to complete the ORR. The extra power lines and resultant coordination were not planned for when the project was initially scoped and were beyond the initial project plan estimates. The final SOC implementation plan will increase cost to 145 percent and schedule to 161 percent of the initial project scope. NASA reviewed this project during implementation, and given the importance of IT security, approved additional time and funding for the project.	
<i><b>FY 2010 Performance Improvement Plan:</b></i> There are no options to achieving this goal. NASA determined the IT Security Operations Center project implementation fits into the CyberSecurity scope and needed to be accomplished to protect NASA's IT vulnerability.	
<b>10HE09</b>	
<b>Accountable Organization: Science Mission Directorate, Heliophysics Division</b>	
Complete all development projects within 110% of the cost and schedule baseline.	<b>FY 2010 Red</b>
<i><b>Why Measure 10HE09 Was Not Met:</b></i> NASA did not complete the Solar Dynamics Observatory (SDO) within 110 percent of cost and schedule baselines. SDO initially slipped from its 2008 firm slot in the launch manifest due to late delivery of avionics boxes and instruments and problems with electronics parts and the high-speed data bus. SDO then experienced difficulty obtaining a new slot in the launch manifest, as no firm slots were available until 2010 due to multiple Atlas V launch vehicle issues and associated launch queue delays.	
<i><b>FY 2010 Performance Improvement Plan:</b></i> NASA launched SDO in February 2010. This exceeded the original schedule by 48 percent, but the mission's lifecycle cost remains within seven percent of the original cost baseline.	
<b>10ES17</b>	
<b>Accountable Organization: Science Mission Directorate, Earth Science Division</b>	
Complete all development projects within 110% of the cost and schedule baseline.	<b>FY 2010 Red</b>
<i><b>Why Measure 10ES17 Was Not Met:</b></i> NASA did not complete the Glory and Aquarius missions within 10 percent of their cost and schedule baselines.	
<i><b>FY 2010 Performance Improvement Plan:</b></i> The Glory mission experienced significant cost and schedule growth due primarily to the failure of the Orbiting Carbon Observatory (OCO) Taurus XL launch vehicle and issues with the vendor's production of acceptable boards for the Maxwell Single Board Computers. Glory's current projected lifecycle cost is 68 percent higher than the baseline established at Confirmation Review. The mission is tentatively scheduled for a February 2011 launch readiness date, a 72 percent increase in schedule. The Aquarius launch readiness date has been rescheduled for April 2011 due to delays in the development of the international partner's Mission Operations System. The schedule for the mission has increased by 60 percent, but the lifecycle cost remains within 15 percent of the baseline. <sup>3</sup>	

<sup>3</sup> In March 2011, Glory was lost due to a failure of the Taurus XL launch vehicle. Aquarius launched in June 2011.

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<b>ES-11-19 (Efficiency Measure)</b>	
<b>Accountable Organization: Science Mission Directorate, Earth Science Division</b>	
Complete all development projects within 110 percent of the cost and schedule baseline.	<b>FY 2011 Red</b>
<i>Why Measure ES-11-19 Was Not Met:</i> This annual performance goal was not met, due to cost and schedule growth that exceeded 10 percent of their estimated baseline for the NPOESS Preparatory Project (NPP), Glory, and Aquarius missions. The NPP mission experienced delays due to the restructure of the project management and on-going development issues with an instrument, contributed by one of NASA's partners. The Aquarius mission was delayed by NASA's international partner, after the successful delivery of NASA's instrument contribution. The Glory mission had both instrument and spacecraft technical issues, across its development.	
<i>FY 2011 Performance Improvement Plan:</i> NASA's new 70 percent CL requirements include consideration of the risks of partnership. These and other procedures subsequently put in place are improving cost and schedule performance.	
<b>ES-12-20 (Efficiency Measure)</b>	
<b>Accountable Organization: Science Mission Directorate, Earth Science Division</b>	
Complete all development projects within 110 percent of the cost and schedule baseline.	<b>FY 2012 Red</b>
<i>Why Measure ES-12-20 Was Not Met:</i> NASA did not achieve this annual performance goal due to cost and schedule growth that exceeded 10 percent of the estimated baseline for the NPOESS Preparatory Project (NPP), which launched in FY 2012. The NPP project experienced delays due to on-going development issues with instruments provided by NASA's government partners.	
<i>FY 2012 Performance Improvement Plan:</i> NASA successfully launched the NPP spacecraft on October 28, 2011, ending the project's development phase. No further performance improvement activities are necessary.	
<b>PS-12-14 (Efficiency Measure)</b>	
<b>Accountable Organization: Science Mission Directorate, Planetary Science Division</b>	
Complete all development projects within 110 percent of the cost and schedule baseline.	<b>FY 2012 Red</b>
<i>Why Measure PS-12-14 Was Not Met:</i> NASA did not achieve this annual performance goal due to Mars Science Laboratory (MSL) cost growth that exceeded 10 percent of the estimated baseline at the Confirmation Review. MSL has demonstrated spectacular technical success, but it launched after a two-year delay and nearly 55 percent lifecycle cost growth from its originally confirmed baseline.	
<i>FY 2012 Performance Improvement Plan:</i> MSL launched on November 26, 2011, ending the project's development phase. The Curiosity rover has been successfully operating on Mars since August 6, 2012. NASA's risk-based approach to budgeting and planning has proven to be successful, as evidenced by cost and schedule performance on the Juno and GRAIL missions. These missions, which also launched in FY 2012, remained within their cost and schedule baselines. No further performance improvement activities are necessary.	
<b>AS-12-6 (Efficiency Measure)</b>	
<b>Accountable Organization: Science Mission Directorate, Astrophysics Division</b>	
Complete all development projects within 110 percent of the cost and schedule baseline.	<b>FY 2012 Yellow</b>
<i>Why Measure AS-12-6 Was Not Met:</i> NASA did not achieve this annual performance goal due to schedule growth that exceeded 10 percent of the estimated baseline at the Confirmation Review. The NuSTAR project realized 17	

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<p>percent schedule growth due to delays in the launch provider's validation of flight software associated with the new launch vehicle flight computer and subsequent launch site availability issues. Based on these factors, the NuSTAR launch slipped from March to June 2012. Project costs, however, remained well within the threshold, at three percent growth from the confirmed baseline.</p>	
<p><b>FY 2012 Performance Improvement Plan:</b> The NuSTAR spacecraft successfully launched on June 13, 2012, ending the project's development phase. No further performance improvement activities are necessary.</p>	

Development Partner Challenges	
10ES02	
Accountable Organization: Science Mission Directorate, Earth Science Division	
<p>Develop missions in support of this Outcome, as demonstrated by completing Aquarius Operational Readiness Review (ORR).</p>	<b>FY 2010 Yellow</b>
<p><b>Why Measure 10ES02 Was Not Met:</b> Due to delays in the development of the international partner's Mission Operations System, the ORR was not completed in FY 2010.</p>	
<p><b>FY 2010 Performance Improvement Plan:</b> A specific date has not been identified, but NASA estimates this to be in early 2011. However, any delays to the overall mission schedule could cause the ORR to move further.</p>	
<p><b>FY 2011 Update:</b> The Aquarius Operational Readiness Review was completed April 28, 2011.</p>	

Vendor Quality, Parts, and Processes	
10ES21	
Accountable Organization: Science Mission Directorate, Earth Science Division	
<p>Develop missions in support of this Outcome, as demonstrated by completing the Pre-Ship Comprehensive Performance Test for Glory.</p>	<b>FY 2010 Yellow</b>
<p><b>Why Measure 10ES21 Was Not Met:</b> The Glory Pre-Ship Comprehensive Performance Test began on September 17, 2010, but was not completed until October 4, 2010. The test was delayed primarily due to resolution of spacecraft hardware anomalies.</p>	
<p><b>FY 2010 Performance Improvement Plan:</b> The test was completed successfully on October 4, 2010.</p>	
10AS07	
Accountable Organization: Science Mission Directorate, Astrophysics Division	
<p>Develop missions in support of this Outcome, as demonstrated by completing the first competed Early Science observations on the Stratospheric Observatory for Infrared Astronomy (SOFIA).</p>	<b>FY 2010 Yellow</b>
<p><b>Why Measure 10AS07 Was Not Met:</b> Technical problems with the telescope cavity door actuator on the SOFIA aircraft, due to quality control issues at the vendor of the actuator, led to increased time required for flight testing and certification for open-door flight at the altitude required for Early Science. NASA worked directly with the vendor to address and resolve the quality control issues.</p>	
<p><b>FY 2010 Performance Improvement Plan:</b> Flight testing of the full flight envelope has been completed, and the first image has been acquired by the telescope in flight. The program is currently on track for the first Early Science observation by December 2010.</p>	

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<p><b>FY 2011 Update:</b> SOFIA completed the first of three science flights on Wednesday, December 1, 2010.</p>	
<p><b>ES-11-3 (Performance Goal 2.1.1.2)</b></p>	
<p><b>Accountable Organization: Science Mission Directorate, Earth Science Division</b></p>	
<p>Initiate the Orbiting Carbon Observatory-2 (OCO-2) Instrument and Spacecraft System-Level Testing.</p>	
<p><b>Why Measure ES-11-3 Was Not Met:</b> The OCO-2 instrument system-level testing was scheduled to begin in August 2011, but has been delayed to October due to technical issues. Technical issues included a coating adhesion issue on multiple parts that was introduced by contamination during the vendor’s process, and a misalignment along an optical path on the instrument, which was seen during vibration testing and could impact performance. Additionally, the spacecraft-level system testing is scheduled to begin in December 2011, due to late deliverables from subsystem vendors. At this time, the overall delivery of the spacecraft remains unchanged for March 2012, but the instrument delivery has been delayed by one month to April 2012, and NASA continues to work with its vendors to address these issues and prevent further delays.</p>	
<p><b>FY 2011 Performance Improvement Plan:</b> To address the coating adhesion issue, a decision was made to proceed with an alternate vendor and process (black anodizing) for the parts. The change was implemented and all parts now meet specification. Additionally, the optical path misalignment issue was addressed and appears to be resolved, but it will remain open until confirmed during instrument-level vibration testing (scheduled for December 2011). These two issues have resulted in an approximately a one month delay in delivery of the instrument (now April 2012). This delay is not expected to impact the overall delivery schedule of the observatory or the launch readiness date (LRD). The Spacecraft System-Level Testing has been scheduled for December 2011 due to the late subsystem vendor deliveries. However, the spacecraft remains on plan to be delivered in March 2012, with no impact to the launch readiness review.</p>	<p><b>FY 2011 Yellow</b></p>
<p><b>FY 2012 Update:</b> NASA completed the OCO-2 Systems Integration Review, which signifies the beginning of the testing and integration phase of spacecraft development, in May 2012. System-level testing for the OCO-2 instrument and spacecraft both began in FY 2012. NASA completed instrument system-level testing and continues spacecraft system-level testing. The mission is on track for launch in 2014.</p>	
<p><b>ES-11-6 (Performance Goal 2.1.2.2)</b></p>	
<p><b>Accountable Organization: Science Mission Directorate, Earth Science Division</b></p>	
<p>Complete the Global Precipitation Measurement (GPM) Systems Integration Review</p>	
<p><b>Why Measure ES-11-6 Was Not Met:</b> Both the NASA spacecraft and instrument developments are experiencing challenges in subsystem deliveries. These development challenges are resulting from various issues including defects discovered in flight parts, component manufacturing throughput issues and workmanship issues at supply vendors. In addition, the delivery of the Japan Aerospace Exploration Agency (JAXA)-provided Dual-frequency Precipitation Radar (DPR) instrument has been delayed due to disruptions at, and damage to, the test facility resulting from the March 2011 earthquake. Technical issues with the DPR were also identified during environmental testing. It is currently estimated that these challenges will result in a launch readiness delay of eleven months, from July 2013 to June 2014.</p>	
<p><b>FY 2011 Performance Improvement Plan:</b> NASA and JAXA are working together to replan the program to accommodate these delays. NASA and JAXA have taken actions that include implementing extended shifts/weekend work and integration and testing workarounds (for NASA, the use of engineering test units in place of flight subsystems) to recover schedule where feasible. Completion of the Systems Integration Review is scheduled for the second quarter of FY 2012.</p>	<p><b>FY 2011 Yellow</b></p>
<p><b>FY 2012 Update:</b> NASA completed the GPM Systems Integration Review in February 2012, and as of December 2012, the integrated spacecraft was in system-level thermal vacuum testing. The mission is on track for launch in 2014.</p>	

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Launch Vehicle Availability &and Reliability/Manifest Issues	
<b>10ES10</b>	
<b>Accountable Organization: Science Mission Directorate, Earth Science Division</b>	
Develop missions in support of this Outcome, as demonstrated by completing the SMAP Preliminary Design Review (PDR).	<b>FY 2010 Yellow</b>
<i><b>Why Measure 10ES10 Was Not Met:</b></i> The Soil Moisture Active and Passive (SMAP) mission PDR is currently scheduled for March 2011, consistent with the schedule presented at the mission's Initial Confirmation Review.	
<i><b>FY 2010 Performance Improvement Plan:</b></i> Currently, all pre-cursor events (i.e., peer reviews, sub-system PDRs) are proceeding on or ahead of plan. However, a launch vehicle has not yet been selected for SMAP, and this could impact the scheduling of PDR. NASA is addressing this issue, but it is not expected to be resolved until after March.	
<i><b>FY 2011 Update:</b></i> The Preliminary Design Review for the SMAP mission occurred in October 2011.	
<b>ES-11-10 (Performance Goal 2.1.4.2)</b>	
<b>Accountable Organization: Science Mission Directorate, Earth Science Division</b>	
Complete the Soil Moisture Active-Passive (SMAP) Confirmation Review.	<b>FY 2011 Yellow</b>
<i><b>Why Measure ES-11-10 Was Not Met:</b></i> The SMAP Confirmation Review was delayed to FY 2012 because of difficulties in identifying an acceptable launch vehicle for the mission. NASA's Earth Science program has been impacted by the current limited availability of launch vehicles in the medium size range that is appropriate for most of its missions.	
<i><b>FY 2011 Performance Improvement Plan:</b></i> The SMAP Confirmation Review has been rescheduled until the second quarter of FY 2012. The Science Mission Directorate (SMD) plans to conduct a Directorate-level Program Management Council (DPMC) review in November 2011 to assess project status and establish near-term observatory development guidelines and constraints following the recent Preliminary Design Review. To conduct PDR, SMD management requested the project assume use of a Minotaur IV+ launch vehicle. This DPMC will also assess a plan to establish a project baseline cost and schedule, that is independent of a confirmed launch vehicle (which is not expected until mid 2012). This plan forward will consider analysis of observatory design, cost and schedule risks, and any additional required reviews. In parallel with these activities, SMD will continue to work with the Human Exploration and Operations Directorate to pursue launch vehicle options for SMAP.	
<i><b>FY 2012 Update:</b></i> NASA completed the SMAP Confirmation Review in May 2012.	
<b>Funding Instability and Limitations</b>	
<b>ES-11-14 (Performance Goal 2.1.5.3)</b>	
<b>Accountable Organization: Science Mission Directorate, Earth Science Division</b>	
Complete the ICESat-2 Spacecraft System Requirements Review.	<b>FY 2011 Yellow</b>
<i><b>Why Measure ES-11-14 Was Not Met:</b></i> The date for the ICESat-2 Spacecraft Systems Requirements Review has been delayed to December 2011. This review was rescheduled from March 2011 to revisit the mission design and requirements to align with the estimated available budget, moving forward.	

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<p><b>FY 2011 Performance Improvement Plan:</b> The mission design and requirements have been revised to align to the available funds. As part of the realignment, the mission is moving forward based on a co-manifested launch solution, with shared launch costs, with the Air Force. The Spacecraft System Requirements Review is scheduled for December 2011. The mission's baseline plan is to be manifested with the Defense Meteorological Satellite Program Flight-20 (DMSP F-20) on an Atlas V launch vehicle that has already been purchased by the U.S. Air Force (USAF). NASA will be responsible for funding the Dual Spacecraft System (DSS) development and flight unit qualification. The DSS will represent a new capability for U.S. Government payloads using the EELV launch system. The USAF will procure the launch service and provide overall mission assurance related to the launch vehicle and dual payload accommodation. This interagency arrangement provides significant cost savings for NASA, allowing the mission to proceed within its allocated budget.</p>	
<p><b>FY 2012 Update:</b> NASA completed the ICESat-2 System Requirements Review in January 2012. Subsequently, the Air Force determined that they would not be able to proceed with the planned partnership. NASA made the necessary program adjustments to provide the funding for the procurement of a dedicated launch vehicle, which was to have been contributed in the partnership.</p>	
<p><b>ES-12-13 (Performance Goal 2.1.5.3)</b></p>	
<p><b>Accountable Organization: Science Mission Directorate, Earth Science Division</b></p>	
<p>Complete the Ice, Cloud, and Land Elevation Satellite-2 (ICESat-2) Preliminary Design Review.</p>	<p><b>FY 2012 Yellow</b></p>
<p><b>Why Measure ES-12-13 Was Not Met:</b> NASA delayed the date for the ICESat-2 Preliminary Design Review from July 2012 to October 2012 so the project could revisit the mission design and requirements in order to align with the estimated available budget, moving forward in fiscal years 2014 and 2015.</p> <p>The ICESat-2 project has received three Yellow ratings during the four years it has been in performance review. The project has received all of these during its formulation phase. The first Yellow rating occurred early in the project's formulation, when the Earth Systematic Missions Program was conducting the advanced concepts study. The other two Yellows have been the result of NASA's difficulty in acquiring a launch vehicle. This challenge has resulted in changes to the project budget and schedule delays. NASA remains dedicated to the ICESat-2 project because the spacecraft will be an integral part of NASA's Earth-observation fleet of satellites. It will provide estimates of ice sheet thickness and help scientists determine ice sheet contributions to recent sea level change. The first mission, ICESat, successfully completed operations in 2009, and NASA has been conducting observations from aircraft, through the IceBridge project, in the interim between ICESat missions.</p>	
<p><b>FY 2012 Performance Improvement Plan:</b> NASA completed the preliminary design review in October 2012. Mission confirmation followed in December by mission confirmation, which established a baseline cost and schedule commitment. No further performance improvement activities are necessary.</p>	

<p><b>Program Planning and Controls</b></p>	
<p><b>10IT06</b></p>	
<p><b>Accountable Organization: Office of the Chief Information Officer</b></p>	
<p>Complete Operational Readiness Review (ORR) for the NASA Security Operations Center.</p>	<p><b>FY 2010 Red</b></p>
<p><b>Why Measure 10IT06 Was Not Met:</b> The Security Operations Center (SOC) Implementation Project was scheduled to have the ORR this year, but has undergone schedule slips due to delays in facilities power modifications and further delays in receiving IT Security data from numerous sources across the Agency. These delays have negated the ability to complete the testing required in preparation of the Operational Readiness Review.</p>	

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<p><b>FY 2010 Performance Improvement Plan:</b> The SOC Implementation Project will move forward with IT Security event data collection in fall 2010. As the data is obtained, the project will complete final system integration and validation testing. Upon completing validation testing and user training the project will precede to ORR currently scheduled for November FY 2011.</p>	
<p><b>FY 2011 Update:</b> The SOC ORR was completed March 2011.</p>	
<p><b>10SFS07</b></p>	
<p><b>Accountable Organization: Space Operations Mission Directorate, Space and Flight Support</b></p>	
<p>Complete TDRS K/L Project Mission Operations Review (MOR).</p>	<p><b>FY 2010 Yellow</b></p>
<p><b>Why Measure 10SFS07 Was Not Met:</b> The TDRS project had originally scheduled the K/L MOR for September 2010 but was delayed to resolve minor conflicts involving resources.</p>	
<p><b>FY 2010 Performance Improvement Plan:</b> The MOR will be held in November 2010.</p>	
<p><b>FY 2011 Update:</b> The Mission Operations Review was held in November 2010.</p>	
<p><b>10PS06</b></p>	
<p><b>Accountable Organization: Science Mission Directorate, Planetary Science Division</b></p>	
<p>Develop missions in support of this Outcome, as demonstrated by completing the Mars Science Laboratory (MSL) flight hardware builds and flight system assemblies.</p>	<p><b>FY 2010 Yellow</b></p>
<p><b>Why Measure 10PS06 Was Not Met:</b> The flight hardware build and flight system assembly of the Sample Analysis at Mars (SAM) instrument were not completed during the designated fiscal year, due to complications in the development of the Wide Range Pump (WRP) components of the instrument. The materials originally specified as the primary component of a high-speed, high-performance bearing proved to be inadequate to provide the necessary performance on the surface of Mars, and alternative bearing materials and components had to be researched and developed.</p>	
<p><b>FY 2010 Performance Improvement Plan:</b> The development of the new bearing designs has been completed and implemented, and the finalization of the flight hardware build has resumed. The final flight units are on schedule to be delivered in early December 2010.</p>	
<p><b>FY 2011 Update:</b> The work was completed by redesigning the primary bearings on the pump from alternate materials that provided the required performance for the Mars environment. Design, fabrication, testing, validation, and installation of the new bearings were completed according to the revised schedule. The pump was completed and delivered to the flight project as scheduled in December 2010.</p>	
<p><b>Performance Goal 2.4.2.2</b></p>	
<p><b>Accountable Organization: Science Mission Directorate, James Webb Space Telescope Program</b></p>	
<p>Design and assemble James Webb Space Telescope (JWST).</p>	<p><b>FY 2011 Yellow</b></p>
<p><b>Why Performance Goal 2.4.2.2 Was Not Met:</b> The measure was placed in the FY 2012 Congressional Justification prior to the project's replan. Based on this, the baseline assumption for the measure was that the project was still operating under the original baseline. The new estimated baseline, which was approved late in the fiscal year, resulted in a 78% increase in the estimated life cycle cost from the original baseline. The new estimated baseline has been endorsed by the NASA Administrator, all reporting required by Section 103 of the NASA Authorization Act of 2005 has been completed, and 95% of the FY 2011 planned activities were accomplished, indicating that it is likely to stay on track for the new estimated cost. Specifically, JWST achieved 19 of its 21 planned FY 2011</p>	

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<p>milestones on or ahead of schedule, one milestone was achieved one month late and one milestone was delayed due to design changes, and is on track to achieve its FY 2012 milestones. The one planned FY 2011 milestone that was achieved a month late and the one that has been delayed do not impact the critical path.</p>	
<p><b>FY 2011 Performance Improvement Plan:</b> NASA has taken many steps to address the challenges seen on the JWST Project. In FY 2010, an independent panel concluded that the problems causing cost growth and schedule delays on the JWST project were associated with cost estimation and program management. To address these, NASA made several important changes in JWST program and project management and in the interaction with the prime contractor. All the JWST senior management at both Headquarters and at Goddard Space Flight Center have been replaced. The program has been taken out of the Astrophysics Division and now reports programmatically to the NASA Associate Administrator, and is an Agency priority. NASA also embarked on revising the cost and schedule estimates. The replanning activity is complete, has been approved within the Agency. The Agency will continue to monitor the progress on the development of this project, as highlighted above.</p>	
<p><b>FY 2012 Update:</b> Not applicable.</p>	
<p><b>ES-12-5 (Performance Goal 2.1.2.2)</b></p>	
<p><b>Accountable Organization: Science Mission Directorate, Earth Science Division</b></p>	
<p>Complete the Global Precipitation Measurement (GPM) Pre-Environmental Review.</p>	
<p><b>Why Measure ES-12-5 Was Not Met:</b> The GPM Pre-Environmental Review (PER) was delayed from September to October 2012 due to multiple integration and test issues. NASA allowed the extra time so the project could investigate High Gain Antenna System mechanical interference and GPM Microwave Imager (GMI) Radio Frequency interference. The delay also allowed the project to closeout several subsystem test Problem Reports and complete installation of the remaining Thermal Control System components. All of these activities were necessary prior to NASA conducting the Comprehensive Performance Test (CPT), which is required prior to conducting the PER.</p> <p>Throughout the GPM project, NASA has had to adjust the schedules as a result of challenges in component deliveries, delivery of the partner-provided instruments, and system integration and test, which are often encountered during the development of space flight hardware. However, subsequent to a replan, the project has maintained its budget and launch date commitments, despite additional delays to interim milestones.</p>	<p><b>FY 2012 Yellow</b></p>
<p><b>FY 2012 Performance Improvement Plan:</b> NASA resolved GPM's integration and test issues. All required work was completed and the CPT was completed on October 16, 2012. NASA completed the GPM PER on October 22-23, 2012. No further performance improvement activities are necessary.</p>	

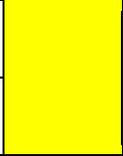
<p><b>Acquisition Management Challenges</b></p>	
<p><b>10SFS08</b></p>	
<p><b>Accountable Organization: Space Operations Mission Directorate, Space Communications and Navigation</b></p>	
<p>Complete SN Ground Segment Sustainment project (SGSS) Mission Definition Review.</p>	
<p><b>Why Measure 10SFS08 Was Not Met:</b> The SGSS Mission Definition Review did not occur as planned due to an on-going contractor protest.</p>	
<p><b>FY 2010 Performance Improvement Plan:</b> NASA will develop a new plan and schedule for completing the Mission Definition Review once the protest is adjudicated.</p>	<p><b>FY 2010 Yellow</b></p>
<p><b>FY 2011 Update:</b> The SGSS contract award was upheld in FY 2011. After the contract was initiated, it was determined that dividing the Mission Definition Review into two parts, with the first part focused on the technical</p>	

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review and the second part focused on budget, was the appropriate approach. The technical review, which was very successful, was held in July 2011; the second review is scheduled to be held in December 2011.	
<b>10PS05</b>	
<b>Accountable Organization: Science Mission Directorate, Planetary Science Division</b>	
Develop missions in support of this Outcome, as demonstrated by selecting concept studies for the Discovery 12 mission.	
<i>Why Measure 10PS05 Was Not Met:</i> The acquisition timeline for the Discovery 12 mission was extended due to the complexity of the Announcement of Opportunity, which includes the potential use of radioisotope power systems.	<b>FY 2010 Yellow</b>
<i>FY 2010 Performance Improvement Plan:</i> Twenty-eight proposals have been received. Selection of concept studies is scheduled for mid-FY 2011.	
<i>FY 2011 Plan Update:</i> In May 2011, NASA selected three mission concepts (GEMS, TiME, and Comet Hopper) for study from the 28 proposals received. After a detailed review of the three concept studies in 2012, one will be selected as the 12th Discovery Program mission.	
<b>AMO-11-12 (Performance Goal 5.2.2.1)</b>	
<b>Accountable Organization: Office of the Chief Information Officer</b>	
Achieve Initial Operating Capability (IOC) for five Service Offices (Web Services, Communications, Enterprise Service Desk, End User Services, and NASA Enterprise Applications) as part of the NASA Information Technology Infrastructure Integration Program (I3P).	
<i>Why Measure AMO-11-12 Was Not Met:</i> Four of the five planned service offices achieved Initial Operating Capability (IOC). The End User Services (ACES), Enterprise Applications (EAST), Enterprise Service Desk (ESD), and Communications (NICS–Networking) services all have their office structures in place, are managing the transition to these new services, and continue to operate the current services. The one service office that did not reach IOC in FY 2011 is the one for the Web services (WEST). The implementation of this initiative has been delayed to resolve some issues with the contract award. NASA remains on track for the consolidation and centralization of these services and capabilities by 2014.	<b>FY 2011 Yellow</b>
<i>FY 2011 Performance Improvement Plan:</i> NASA will continue to work through the issues with the contract award of the web services capability. The implementation of the WEST will be revisited once these issues are resolved.	
<i>FY 2012 Update:</i> NASA resolved issues with the contract award for WEST. Under the resolution, the originally planned Web Services were restructured and NASA has released a solicitation for WESTPRIME. NASA currently is evaluating the proposals received from the solicitation.	
<b>PS-12-2 (Performance Goal 2.3.1.2)</b>	
<b>Accountable Organization: Science Mission Directorate, Planetary Science Division</b>	
Complete New Frontiers 3 Preliminary Design Review.	
<i>Why Measure PS-12-2 Was Not Met:</i> At the time of the performance plan update, NASA had not completed the final negotiation on the procurement the Origins Spectral Interpretation Resource Identification Security Regolith Explorer (OSIRIS-REx) mission. The final agreement resulted in a proposed extended Phase B for the OSIRIS-REx project, which moved the Preliminary Design Review (the APG milestone) beyond fiscal year 2012, with the planned completion of the Mission Definition Review in FY 2012 instead. NASA made this change to reduce risk	<b>FY 2012 Yellow</b>

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to cost and schedule performance for the project.	
<i><b>FY 2012 Performance Improvement Plan:</b></i> NASA has completed the Preliminary Design Review. No further performance improvement activities are necessary.	

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### Highlighted Performance Trend: Commercial Spaceflight Successfully Reaching the International Space Station

In FY 2012, NASA’s Commercial Orbital Transportation Services partners, Space Exploration Technologies Corporation (SpaceX) and Orbital Sciences Corporation (Orbital), continued to make progress toward developing systems to provide cargo resupply services to the International Space Station (ISS). Leveraging commercial partners for these tasks is a new way of doing business for NASA, and the activity continues to be a learning experience for both NASA and the partners. As the partners transitioned from development to integration and testing, they encountered technical challenges, as is common in the development of any major space system. The resolution of these challenges has caused delays to the partners’ demonstration flights.

Outcome 5.2	
Accountable Organization: Exploration Systems Mission Directorate, Constellation Systems	
By 2010, demonstrate one or more commercial space capabilities for ISS cargo and/or crew transport.	<b>FY 2010 Yellow</b>
<i><b>Why Outcome 5.2 Was Not Met:</b></i> Both partners, Space Exploration Technologies Corporation (SpaceX) and Orbital Sciences Corporation (Orbital), are making progress in demonstrating their respective transportation capabilities. The partners moved their initial demonstration flights to FY 2011 due to technical issues encountered during development efforts.	
<i><b>FY 2010 Performance Improvement Plan:</b></i> SpaceX is planning for its first ISS demonstration flight in late fall 2010, with remaining flights scheduled for later in FY 2011. Orbital currently is planning its demonstration flight for fall 2011.	
<i><b>FY 2011 Update:</b></i> NASA Commercial Orbital Transportation Services (COTS) partner SpaceX successfully completed their Demonstration 1 mission on December 8, 2010.	
10CS07	
Accountable Organization: Exploration Systems Mission Directorate, Constellation Systems	
In FY 2010, have at least one partner demonstrate flight proximity operations with ISS.	<b>FY 2010 Yellow</b>
<i><b>Why Measure 10CS07 Was Not Met:</b></i> Both partners, SpaceX and Orbital, made progress in demonstrating their respective transportation capabilities. The partners moved their initial demonstration flights to FY 2011 due to technical issues encountered during development efforts and are continuing toward demonstrating flight operations with ISS in FY 2011.	
<i><b>FY 2010 Performance Improvement Plan:</b></i> The second SpaceX flight, in June 2011, will demonstrate flight proximity operations with ISS. Orbital currently anticipates scheduling its demonstration flight for FY 2012.	
<i><b>FY 2011 Update:</b></i> APG 10CS07 was not completed in FY 2011 due to development challenges. Partner experienced delays as their program transitioned from design to integration and test; however, they continue to make technical progress toward their development and demonstration milestones. These challenges continue to be resolved, and NASA continues to work with our partners.	

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10CS08	
Accountable Organization: Exploration Systems Mission Directorate, Constellation Systems	
By the end of FY 2010, conduct one or more demonstration flights to, and berth with, the ISS.	<b>FY 2010 Yellow</b>
<b>Why Measure 10CS08 Was Not Met:</b> Both partners, SpaceX and Orbital, made progress in demonstrating their respective transportation capabilities. The partners moved their initial demonstration flights to FY 2011 due to technical issues encountered during development efforts and are continuing toward demonstration flights to, and berthing with, ISS in FY 2011.	
<b>FY 2010 Performance Improvement Plan:</b> SpaceX is planning for its third demonstration flight to, and berth with, ISS in late FY 2011. Orbital currently anticipates scheduling its demonstration flight for FY 2012.	
<b>FY 2011 Update:</b> APG 10CS08 was not accomplished due to development challenges. Partner experienced delays as their program transitioned from design to integration and test, they both continue to make technical progress toward their development and demonstration milestones. These challenges continue to be resolved, and NASA continues to work with our partners.	

In FY 2011, NASA augmented funding for the COTS Space Act Agreements with additional milestones for risk-mitigation, including a first flight of Orbital's Taurus II launch vehicle. NASA worked with its partners to ensure success of the COTS development through completion of demonstration flights and start of commercial resupply services to ISS in FY 2012. In May 2012, SpaceX launched its first demonstration of its COTS capabilities and then successfully reached ISS with the first commercial resupply mission in October 2012. In Spring 2013, Orbital plans to demonstrate proximity operations and ISS berthing to complete the COTS milestones and prove maturity of the systems for ISS commercial resupply services.

NASA reviewed its annual performance goals (APGs) related to commercial spaceflight development from FY 2010 to FY 2012. The APGs below demonstrate the technical challenges inherent to development of major space systems. In FY 2010, the Agency rated Yellow one outcome and two annual performance goals; in FY 2011, NASA rated two APGs Yellow. NASA and its partners continue to address these challenges while progressing toward success. As of FY 2012, NASA rated Green its two APGs related to commercial spaceflight development. These APGs reflect the success of SpaceX's demonstration flights in 2012.

CS-11-2 (Performance Goal 1.2.1.1)	
Accountable Organization: Human Exploration and Operations, Commercial Spaceflight	
Conduct a minimum of one commercial cargo demonstration flight of proximity operations with ISS.	<b>FY 2011 Yellow</b>
<b>Why Measure CS-11-2 Was Not Met:</b> This annual performance goal was not met in FY 2011 and is planned to occur in FY 2012. This performance target was not accomplished due to development challenges by NASA's partners. These partners experienced delays as their programs transitioned from design to integration and test, and they both continue to make technical progress toward their development and demonstration milestones.	
<b>FY 2011 Performance Improvement Plan:</b> SpaceX and Orbital continue to make progress, mitigating risk and solving technical challenges, and plan a demonstration of proximity operations with ISS in FY 2012. During FY 2011, NASA negotiated additional risk mitigation milestones with each partner. The additional milestones help to improve mission success by (1) augmenting ground and flight testing; (2) accelerating development of enhanced cargo capabilities; or (3) further developing ground infrastructure needed for commercial cargo capabilities.	

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<p><b>FY 2012 Update:</b> SpaceX successfully conducted proximity operations with ISS during its commercial cargo transportation system demonstration mission to ISS in May 2012. The SpaceX demonstration flight was originally planned as two flights during FY 2012, one that would demonstrate proximity operations and another that would safely berth with ISS; however, SpaceX requested, and the ISS Program approved, combining the two flights into one flight.</p>	
<p><b>CS-11-3 (Performance Goal 1.2.1.1)</b></p>	
<p><b>Accountable Organization: Human Exploration and Operations, Commercial Spaceflight</b></p>	
<p>Conduct a minimum of one safe berthing of commercial cargo transportation systems with the ISS.</p>	
<p><b>Why Measure CS-11-3 Was Not Met:</b> This annual performance goal was not met in FY 2011 and is planned to occur in FY 2012. This performance target was not accomplished due to development challenges by NASA's partners. These partners experienced delays as their programs transitioned from design to integration and test, and they both continue to make technical progress toward their development and demonstration milestones.</p>	<p><b>FY 2011 Yellow</b></p>
<p><b>FY 2011 Performance Improvement Plan:</b> SpaceX and Orbital continue to make progress and plan to conduct a minimum of one safe berthing of commercial cargo transportation systems with the ISS in FY 2012. During FY 2011, NASA negotiated additional risk mitigation milestones with each partner to help improve mission success.</p>	
<p><b>FY 2012 Update:</b> SpaceX demonstrated a safe berthing with ISS in May 2012. Orbital is expected to do the same in early calendar year 2013.</p>	

<p><b>ISS-12-3 (Performance Goal 1.1.1.3)</b></p>	
<p><b>Accountable Organization: Human Exploration and Operations, International Space Station</b></p>	
<p>Complete at least two flights to the ISS by U.S. developed cargo delivery systems.</p>	
<p>SpaceX launched its first demonstration flight on May 19, 2012, berthed to ISS, and returned successfully on May 31. SpaceX conducted a second flight, providing cargo to ISS, in October 2012. The SpaceX demonstration flight was originally planned as two flights during FY 2012; however, SpaceX requested, and the ISS Program approved, combining the two into one flight. The SpaceX-1 cargo flight was planned for September 2012, but occurred in October due to a crowded on-orbit schedule. The first Orbital flight is planned for Spring 2013.</p>	<p><b>FY 2012 Green</b></p>
<p><b>CS-12-1 (Performance Goal 1.2.1.1)</b></p>	
<p><b>Accountable Organization: Human Exploration and Operations, Commercial Spaceflight</b></p>	
<p>Perform Commercial Orbital Transportation Services (COTS) cargo demonstration missions and continue commercial crew transportation systems development.</p>	
<p>On May 31, 2012, SpaceX successfully completed its final COTS demonstration mission to ISS, completing all test objectives. NASA continues to partner with multiple companies on commercial crew development activities and is nearing completion of the second phase of Commercial Crew Development agreements. For the next phase, NASA signed crew development Space Act Agreements in August 2012 for the Commercial Crew Integrated Capability initiative.</p>	<p><b>FY 2012 Green</b></p>

## ADDRESSING MANAGEMENT CHALLENGES AND IMPROVING PERFORMANCE

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### Highlighted Performance Trend: Improved Performance Measurement Helps Identify Diversity Challenges

NASA values its workforce and strives to improve its productive environment. The ultimate goal is to ensure the workplace allows employees from diverse backgrounds, ethnicities, and genders to reach their potential and contribute to NASA’s mission. Multiple offices work together to this end, including the Office of Human Capital Management and the Office of Diversity and Equal Opportunity. NASA reviewed its APGs where performance fell short in the areas of workforce, workplace, and diversity. The APGs below demonstrate the results of NASA’s continuing efforts to improve the workforce environment for all employees through multiple initiatives.

The Office of Education also contributes to developing a diverse science, technology, engineering, and mathematics (STEM) workforce, one that NASA can draw upon to support future missions. Multiple factors can impact these efforts, including funding delays, imperfect data collection methods, and mid-year changes to priorities. In FY 2012, NASA modified its methodology for assessing progress toward the targeted participation of its higher education programs in the Office of Education, to improve insight and visibility into each program’s contribution. As planned, NASA also took the first step to include data from other mission organizations beyond NASA headquarters. Implementing the new methodology highlighted additional challenges across multiple programs that will require corrective actions to reach NASA’s targets. Specifically, past data collection mainly pointed to the Space Grant Program, the single greatest contributor; however, under the new methodology all programs’ impacts are being factored. To achieve greater participation at an Agency level for underserved and underrepresented populations and women, NASA plans to set a holistic strategy for greater contribution across the entire portfolio of projects.

The following tables list APGs from FY 2010 to FY 2012 that NASA rated Yellow: two in FY 2010, four in FY 2011, and one in FY 2012. Additionally, NASA rated one APG Red in FY 2012.

Continual Improvement of the Workforce Environment	
AMO-11-6 (Performance Goal 5.1.1.4)	
Accountable Organization: Mission Support Directorate, Office of Human Capital Management	
Identify and address at least two topics that employees identified in the latest Federal Employee Viewpoint Survey.	<b>FY 2011 Yellow</b>
<p><i>Why Measure AMO-11-6 Was Not Met:</i> Many of the planned activities were completed but several have been delayed into FY 2012. Specifically, the identified areas to be addressed, and their corresponding action plan, are as follows:</p> <p>1) Continue focus on teamwork/working together to ensure mission success. Planned actions included continual monitoring of Shuttle workforce concerns through regular surveys; and instituting a team-building focus in Agency leader development programs. The activities toward this topic were completed in this fiscal year.</p> <p>2) Ensure that recognition and rewarding of employees is fair, consistent, and based on results-oriented performance. The planned actions included educating and training supervisors, through Agency supervisory</p>	

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<p>training courses; and implementing recommendations for enhancing the Agency’s Honor Awards Program. Both of these planned actions were delayed into FY 2012. This year’s funding level removed the option for conducting further Agency supervisory courses in FY 2011. Additionally, the development of new policies surrounding the Agency Honor Awards Program, is taking more time than planned, resulting in a delay until FY 2012.</p>	
<p><b>FY 2011 Performance Improvement Plan:</b> These actions will be completed in fiscal year 2012. OHCM will continue focus on teamwork and working together to ensure mission success. Actions include continual monitoring of Shuttle workforce concerns through regular surveys; and team-building focus in Agency leader development programs. OHCM will also ensure that recognition and rewarding of employees is fair, consistent, and based on results-oriented performance. Actions include educating and training supervisors through Agency supervisory training course and to implement recommendations for enhancing the Agency’s Honor Awards Program.</p>	
<p><b>FY 2012 Update:</b> In FY 2012, NASA continued to focus on teamwork to ensure mission success. OHCM worked with the Labor Union to improve the performance management process for General Schedule employees by developing process improvements to the current system, many of which were implemented in the current performance cycle (2012/2013). Informed by the results of a survey on leadership training needs for first line supervisors, OHCM addressed the role of a NASA supervisor, as well as placed an increased emphasis on assuring greater accountability for supervisors through the performance management process. OHCM implemented an improved, streamlined Agency Honor Awards process that provides more opportunities to award individuals for excellent work in a timelier manner.</p>	
<p><b>AMO-11-7 (Performance Goal 5.1.1.5)</b></p>	
<p><b>Accountable Organization: Office of Diversity and Equal Opportunity</b></p>	
<p>Complete FY 2011 actions described in the NASA Model Equal Employment Opportunity (EEO) Agency Plan.</p>	<p><b>FY 2011 Yellow</b></p>
<p><b>Why Measure AMO-11-7 Was Not Met:</b> NASA made significant progress on many of 57 activities, contained in the Model EEO Agency Plan for FY 2011-2013, which have efforts in fiscal year 2011, but did not complete all the planned actions. NASA sought to complete 40 of the 57 actions in the first year of the Plan alone. NASA completed 14 of these actions (35 percent). In addition, NASA completed five actions not targeted for completion until FY 2012. Of the other actions targeted for completion in FY 2011, NASA has partially completed 19 (48 percent). NASA has completed key actions related to the Agency’s Anti-Harassment Program, Conflict Management Program, and the Functional Review Program is on track for completion of its actions. However, as a result of recent Executive Orders that required development of action plans in FY 2010-2011 for Asian Americans and Pacific Islanders, Individuals with Disabilities, and Veterans, NASA had to add multiple actions to the Model EEO Agency Plan. The initial development of these plans, dispositioning of community group comments, and introduction of approximately 20 new actions, mid-year, did not allow time for full progress to be made. All efforts continue to progress, and are expected for completion before the end of the plan’s timeframe.</p>	
<p><b>FY 2011 Performance Improvement Plan:</b> NASA is committed to continuing the efforts to remove barriers to a diverse and inclusive workplace, conducive to employees reaching their potential. In order to fully meet the objectives of the Plan, in FY 2012, NASA will: 1) undertake a careful review of the remaining actions and their target dates, taking into account new information, such as recent Government-wide initiatives relating to EEO and diversity; and 2) revise the Plan accordingly.</p>	
<p><b>FY 2012 Update:</b> NASA reviewed progress toward the planned FY 2011 actions and their target dates in the Model EEO Agency Plan. NASA also revised FY 2012 plans to assure that the outstanding actions were completed in the fiscal year. NASA made significant progress toward the completion of FY 2011 actions and expects to complete them by the end of FY 2013.</p>	

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An Inclusive and Diverse STEM Workforce	
<b>10ED03</b>	
<b>Accountable Organization: Office of Education</b>	
Serve 8,500 under-represented and under-served students in NASA higher education programs.	<b>FY 2010 Yellow</b>
<p><b>Why Measure 10ED03 Was Not Met:</b> In FY 2009, 6,743 higher education students self-reported as being part of an underserved and underrepresented race or ethnicity. This represents 40.6 percent of the total number of higher education students served by NASA in FY 2009, an increase from 28 percent of all higher education students similarly reporting in FY 2008. Of all higher education students served by the Agency, 43 percent self-reported being women, an increase from 41 percent in FY 2008. These figures are well above national averages for participation of minority students according to the National Science Foundation’s report, Women, Minorities, and Persons with Disabilities in Science and Engineering, released in April 2010. The reduction in the number of minority higher education students served (6,743 students rather than the goal of 8,500) also reflects an increased emphasis on institutional awards for education and research, and a corresponding decrease in individual student awards. The overall reduction in direct support to all higher education students in turn affects the total number of higher education underserved and underrepresented students reached by NASA. In FY 2007, the total number of higher education students reached was 34,493; in FY 2008, the number dropped to 24,362, in FY 2009, it dropped further to 24,168. Higher education projects are adjusting to address this trend, but there is significant lag time before results are available (e.g., new course development time, time to execute activities, grant reporting lag time). Another factor adversely influencing the number of individual student awards is the increasing cost of education. To offer individual awards that remain competitive with those of other federal programs and industry, NASA grantees must increase award amounts that meet cost increases in tuition, travel, and other expenses. In a flat or reduced budget environment, an increase in award size means that fewer direct support awards can be made.</p>	
<p><b>FY 2010 Performance Improvement Plan:</b> NASA higher education projects are actively working to increase the participation of underrepresented and underserved students. Future efforts include plans to work more closely with community colleges and institutions that tend to serve large numbers of underserved students. The Space Grant Program, which works with affiliates in all 50 states, the District of Columbia, and Puerto Rico, has actively encouraged state consortia to better engage minority-serving institutions in their networks. The consortia are accountable for improving the participation of underserved students in their programs, determined as a percentage of their audience base. The strategy has been successful, as participation of racially and ethnically underserved and underrepresented students in the Space Grant Program has increased from 15 percent in FY 2007, to 21 percent in FY 2008, and to 29 percent in FY 2009.</p>	
<p><b>FY 2011 Update:</b> The performance improvement plan was successful, and NASA was able to work more closely with community colleges in FY 2010. In doing so, NASA increased its overall reach to underrepresented and underserved populations. However, the number of underrepresented and underserved students reported for FY 2010 does not reflect the increases seen in previous years, due to the availability of data associated with Space Grant activities. NASA released a supplemental competition, not in the first round of competitions, to the Space Grant Consortia to assist in strengthening linkages with Minority Serving Institutions, but this data will not be available until the end of the 2011 calendar year. The competition was released in late FY 2010 due to on-going continuing resolutions which delayed funds. As a result, the currently available FY 2010 results only reflect underrepresented and underserved participation resulting from the standard Space Grant awards. The additional Space Grant awards, are expected to yield additional underrepresented and underserved participants, but will not be available until the grant performance period has concluded and grant reporting is completed.</p>	

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<b>ED-11-1 (Performance Goal 5.1.2.1)</b>	
<b>Accountable Organization: Office of Education</b>	
Achieve 40 percent participation of underserved and underrepresented (in race and/or ethnicity) in NASA higher education projects.	<b>FY 2011 Yellow</b>
<i><b>Why Measure ED-11-1 Was Not Met:</b></i> This annual performance goal was not met. Out of the 15,947 participants in NASA higher education programs who self-reported their race and ethnicity, 35 percent, reported being a member of an underserved or underrepresented race or ethnic group. NASA’s aggressive goal of 40 percent, exceeds the national averages for underserved and underrepresented participation in higher education, and was a challenge that the Agency chose to undertake. The participation in NASA’s programs did meet or exceed the percentages of underrepresented minorities pursuing higher education studies in STEM fields nationwide (between 11 to 21 percent of these degrees, at the bachelor level, according to the National Science Foundation Report, <i>Women, Minorities and Persons with Disabilities in Science and Engineering</i> : 2011).	
<i><b>FY 2011 Performance Improvement Plan:</b></i> The cultivation of diversity is a core value for all NASA education efforts, and NASA will challenge itself to continually improve. The performance improvement plan, that addressed the last fiscal year’s performance, was successful in that NASA was able to work more closely with community colleges in FY 2010, which reflected in increases seen in FY 2011 measures. In doing so, NASA increased its overall reach to underrepresented and underserved populations, moving from one year to the next. NASA has refocused several projects within the Agency’s higher education portfolio during FY 2011 in pursuit of this goal, including the announcement of two new grant opportunities targeted at minority serving institutions and community colleges, which tend to have larger populations of underserved and underrepresented students. In FY 2012, NASA will seek to improve the percentage of underrepresented and underserved students, that participate in its higher education programs by placing increased emphasis on inclusion and participation by these populations in the projects that reach the largest numbers of undergraduate and graduate students, such as the Space Grant Project. Additionally, NASA plans to take a more holistic look, across the Agency, where activities in the mission organizations, may be encouraging participation, and factor in this data for a more complete picture.	
<i><b>FY 2012 Update:</b></i> In FY 2012, NASA placed an increased emphasis on inclusion and participation in the Space Grant Program, which funds approximately 80 percent of the participants in the Office of Education’s higher education programs. Specifically, NASA released a solicitation, through the Space Grant Program, focused on serving undergraduate and K-12 educators who are traditionally underrepresented in STEM fields. Additionally, NASA modified its methodology for assessing progress toward the targeted participation, to improve insight into each higher education program’s contribution. NASA also took the first step at inclusion of the data from the mission organizations, the results of which are outlined in the explanation for ED-12-1.	
<b>ED-12-1 (Performance Goal 5.1.2.1)</b>	
<b>Accountable Organization: Office of Education</b>	
Achieve 40 percent participation of underserved and underrepresented (in race and/or ethnicity) in NASA higher education projects.	<b>FY 2012 Red</b>
<i><b>Why Measure ED-12-1 Was Not Met:</b></i> Out of the 15,585 participants in NASA higher education programs who reported their race and ethnicity, 24 percent reported being a member of an underserved or underrepresented race or ethnic group. NASA removed from the calculation the participants who did not report race or ethnicity. In an effort to better understand the percentage of all participants who may be from underserved or underrepresented populations, NASA also calculated the percentage of self-reported out of the total participants. Under this latter methodology, the participation is reduced to 21 percent. NASA estimates the actual percentage of underserved and underrepresented participants to be between these two figures. Additionally, NASA took a more holistic look across the Agency, where activities in the mission organizations may be encouraging participation, and factored this data. This reduced the overall percentage by one percent.	

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<p><b>FY 2012 Performance Improvement Plan:</b> Based on the insights the changes in methodology highlighted, NASA is creating individual targets for each of its higher education programs, both in the Office of Education and in the mission organizations. These targets will ensure strategic contributions from all of the higher education programs, to achieve greater participation Agency-wide. Additionally, in FY 2013, NASA will seek to improve the percentage of underserved and underrepresented groups that participate in its higher education programs by continuing the One Stop Shopping Initiative (OSSI) for NASA Internships, Fellowships, and Scholarships opportunities. OSSI is a NASA-wide system for the recruitment, application, selection, and career development of undergraduate and graduate student participants. The OSSI Broker-Facilitator Corps will enhance the recruitment of students from all higher education institution types, including Hispanic-Serving Institutions, Predominately Black Institutions, including Historically Black Colleges and Universities, and Tribal Colleges and Universities. All of the Agency's education, internship, fellowship, and scholarship programs and projects will be encouraged to utilize OSSI.</p> <p>NASA will continue to improve its data collection strategies by striving to collect raw data as the events occur, and then verify and validate it on a quarterly basis to move the community towards process improvement practices through the year.</p>	
<b>ED-11-2 (Performance Goal 5.1.2.1)</b>	
<b>Accountable Organization: Office of Education</b>	
Achieve 45 percent participation of women in NASA higher education projects.	<b>FY 2011 Yellow</b>
<p><b>Why Measure ED-11-2 Was Not Met:</b> This annual performance goal was not met. Out of the 15,568 participants in NASA higher education programs who self-reported their gender, 39 percent, reported being female. Albeit a greater number of women currently pursue higher education studies in the United States, men pursue a higher proportion of the degrees in science and engineering fields. For example, compared with men, women earn degrees at medium to low levels in physical sciences and mathematics (between 30 to 44% of these degrees), and at low levels in computer science and engineering (between 18 to 27% of these degrees). Despite the statistics, NASA still chose to set an aggressive goal of 45 percent, and fell just short of the challenge.</p>	
<p><b>FY 2011 Performance Improvement Plan:</b> In FY 2012, NASA will seek to improve the percentage of women that participate in its higher education programs by placing increased emphasis on inclusion and participation by these populations in the projects that reach the largest numbers of undergraduate and graduate students, such as the Space Grant Project. NASA currently conducts a significant number of K-12 and informal STEM education projects that specifically target participation by pre-college girls. By stimulating interest in STEM among young females in the Agency's education pipeline, NASA expects that many of these students will remain engaged and continue to participate in NASA programs upon entering college.</p> <p>Additionally, NASA plans to take a more holistic look, across the Agency, where activities in the mission organizations, may be encouraging participation, and factor in this data for a more complete picture.</p>	
<p><b>FY 2012 Update:</b> In an effort to provide a more comprehensive view of education performance within the Agency, NASA took the first step at inclusion of education project data from the mission organizations and NASA Centers, the results of which are outlined in the explanation for ED-12-2. Also in FY 2012, the Space Grant Program prepared a solicitation focused on serving groups traditionally underrepresented in STEM fields in the undergraduate and K-12 educator communities. NASA will release this solicitation in FY 2013.</p>	
<b>ED-12-2 (Performance Goal 5.1.2.1)</b>	
<b>Accountable Organization: Office of Education</b>	
Achieve 45 percent participation of women in NASA higher education projects.	<b>FY 2012 Yellow</b>
<p><b>Why Measure ED-12-2 Was Not Met:</b> Of the 17,454 participants in NASA higher education programs who reported their gender, 35 percent reported being female. NASA removed from the calculation the participants who did not report gender. In an effort to better understand the percentage of all participants who may be women,</p>	

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<p>NASA also calculated the percentage of self-reported women out of the total participants. Under this latter methodology, the participation is reduced to 21 percent. NASA estimates the actual percentage of woman participants to be between these two figures. Additionally, NASA took a more holistic look across the Agency, where activities in the mission organizations may be encouraging participation, and factored this data. This made no appreciable difference to the overall percentage.</p>	
<p><b>FY 2012 Performance Improvement Plan:</b> Based on insights highlighted by the changes in methodology, NASA is creating individual targets for each of its higher education programs, both in the Office of Education and in the mission organizations. These targets will ensure strategic contributions from all of the higher education programs, to achieve greater participation Agency-wide.</p>	
<p><b>10ED04</b></p>	
<p><b>Accountable Organization: Office of Education</b></p>	
<p>Achieve 60% employment of student participants in FY 2009 NASA higher education programs by NASA, aerospace contractors, universities, and other educational institutions.</p>	<p><b>FY 2010 Yellow</b></p>
<p><b>Why Measure 10ED04 Was Not Met:</b> In FY 2010, NASA’s education workforce development target was 60 percent of students from NASA’s higher education programs entering into NASA-related careers. Of the 1,343 students who self-reported employment data, 625 students (or 46.5 percent) reported working for NASA, aerospace contractors, universities, or other educational institutions. One project, Motivating Undergraduates in Science and Technology (MUST) was used as a prototype for more closely mapping an Office of Education project directly to the NASA Early Career Hiring Initiative. This collaborative approach succeeded in placing 22 of 29 graduates with NASA and JPL. The overall drop in employment rate in these specific sectors, relative to previous years, may be a result of uncertainty in NASA’s plans (e.g., retirement of Space Shuttle Program, future of the Constellation Program), and overall poor health of the U.S. economy in 2008/2009. However, 38.6 percent of graduates (in addition to those hired by NASA, aerospace industry and educational organizations) chose STEM-related careers. One might conclude that NASA in-depth education experiences are indicative of STEM workforce preparation.</p>	
<p><b>FY 2010 Performance Improvement Plan:</b> NASA organizations with a stake in developing the future workforce will continue to work collaboratively with each other and industry partners to identify future workforce trends and needs. New efforts in the One Stop Shopping Initiative include closer collaboration between NASA’s hiring managers and mentors for higher education students.</p>	
<p><b>FY 2011 Update:</b> The performance plan was successful. In the year following, of the graduates who participated in NASA Higher education programs and self-reported employment data, 60.3 percent reported working for NASA, aerospace contractors, universities, or other educational institutions. NASA organizations have worked collaboratively with each other, as well as industry partners, to meet their respective workforce needs. Additionally, closer collaboration between NASA’s hiring managers and mentors for higher education students have yielded positive results.</p>	

## ADDRESSING MANAGEMENT CHALLENGES AND IMPROVING PERFORMANCE

### Performance Improvement Plans for Unmet FY 2012 Measures, Non-trended

NASA reviewed its FY 2012 performance measures where performance fell short. These measures were not evaluated as part of a broader trend in performance. The following tables list performance measures that NASA rated Yellow or Red in 2012.

<b>ERD-12-6 (Performance Goal 3.3.2.1)</b>	
<b>Accountable Organization: Human Exploration and Operations, Exploration Research and Development</b>	
Complete tests of Extra Vehicular Activity (EVA) Portable Life Support System (PLSS) subsystem in a vacuum chamber environment.	<b>FY 2012 Yellow</b>
<i><b>Why Measure ERD-12-6 Was Not Met:</b></i> NASA rescheduled the test of the PLSS in a vacuum chamber to FY 2013 based on a realignment of funding to other priorities. Assembly of the device also was delayed due to component technology development timelines that were greater than anticipated.	
<i><b>FY 2012 Performance Improvement Plan:</b></i> NASA currently is assembling the second generation PLSS and preparing it for testing in FY 2013. NASA tested the first generation of the PLSS in FY 2011. The new technology components, which experienced a delay in FY 2012, have been completed and are being integrated into the system. NASA expects to assemble a third generation PLSS in 2014. This evolutionary approach allows for rapid and affordable development of prototype spacesuits, and design changes can be made in each generation to improve performance. The EVA project is still on track to demonstrate a new spacesuit on ISS by 2020.	
<b>Performance Goal 5.2.2.4</b>	
<b>Accountable Organization: Mission Support Directorate</b>	
By 2015, reduce data center energy consumption by 30 percent.	<b>FY 2012 Yellow</b>
<i><b>Why Performance Goal 5.2.2.4 Was Not Met:</b></i> NASA continued to meter all of the Agency's data centers to allow measurement of energy consumption and the subsequent effects of any improvements. NASA's models estimate that a reduction of approximately three percent has been realized to date, based on the closure of data centers. Congruent with data center closures, other activities were planned to contribute to energy savings: facility upgrades and improvement; replacement of old inefficient mechanical and IT equipment; and virtualizing underutilized IT infrastructure. Based on current plans, in the fiscally constrained environment, these latter activities will not be completed in a timeframe to achieve the targeted energy reduction.	
<i><b>FY 2012 Performance Improvement Plan:</b></i> In FY 2013, NASA plans to revisit this performance goal and to set targets more in line with its plans and other reporting. This performance goal is not consistent with the metrics being reported under the Federal Data Center Consolidation Initiative (FDCCI) and the NASA Strategic Sustainability Performance Plan. Additionally, NASA recognizes that improvements are needed to its predictive models and methodology, which will also be improved in the coming year.	

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<b>ES-12-23(Performance Goal 2.1.5.3)</b>	
<b>Accountable Organization: Science Mission Directorate, Earth Science Division</b>	
Reduce time within which 80 percent of NASA Research Announcement (NRA) grants are awarded, from proposal due date to selection, by four percent per year, with a goal of 180 days.	<b>FY 2012 Red</b>
<b>Why Measure ES-12-23 Was Not Met:</b> The Earth Science Division (ESD) completed 80 percent of FY 2012 selections within 236 days, a small improvement from FY 2011's 240 days. The magnitude of solicitations, based on coverage of the diversity of scientific disciplines, and the number of proposals received continues to provide a challenge to meeting the targeted reductions. Additionally, staff workload is a factor. The small improvement was the result of the development of an integrated plan for the year ahead outlining the solicitations, the expected proposal numbers, and scheduling of review panels, while taking staffing into consideration. However, the planning effort was only starting to take effect in the selections for the current review cycle.	
<b>FY 2012 Performance Improvement Plan:</b> The Earth Science Division will continue to implement its integrated plan in FY 2013 and will measure the impact at the end of the year.	
<b>PS-12-17(Performance Goal 2.1.5.3)</b>	
<b>Accountable Organization: Science Mission Directorate, Planetary Science Division</b>	
Reduce time within which 80 percent of NASA Research Announcement (NRA) grants are awarded, from proposal due date to selection, by four percent per year, with a goal of 180 days.	<b>FY 2012 Red</b>
<b>Why Measure PS-12-17 Was Not Met:</b> The Planetary Science Division completed 80 percent of their selections within 258 days, which represented a significant improvement from the FY 2011 performance of 290 days. The division did not achieve further improvement due to uncertainty in what level of funds would be available for award. The division delayed selections until the uncertainty was resolved.	
<b>FY 2012 Performance Improvement Plan:</b> The Planetary Science Division plans to adopt a strategy employed by the Astrophysics Division to improve the timeline for making selections, while still accounting for any funding uncertainties. Specifically, the division plans to provide partial funds early in the fiscal year for rapid selection of only the best proposals, ensuring that even if there are budget cuts, enough funds will remain for selections in programs scheduled later in the year. This partial funding in the fall will result in a low selection (acceptance) rate early in the year, but will speed overall selections. Later in the year, when the total budget is known, the division will make appropriate adjustments that may allow for more selections in these "early" programs.	

## **ADDRESSING MANAGEMENT CHALLENGES AND IMPROVING PERFORMANCE**

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### **Performance Results Inform Planning**

The preceding assessment of NASA's performance shortfalls in FY 2012 and larger trends across the portfolio highlights the areas for continued monitoring in FY 2013 and beyond. As part of NASA's performance management cycle, the evaluation phase links to both the reporting and planning phases. Performance results are reported to Agency leadership and a wide range of stakeholders, including the White House, Congress, and the public. Equally important, performance results are a key factor in planning future activities. NASA takes advantage of the time between the end of the fiscal year and the release of the Congressional Justification to adjust performance plans for the current and next fiscal years.

Actions that NASA can take to improve performance include policy or procedural changes, increased oversight and assessments, and changes to a program's direction and plans. Based on the evaluation of FY 2012 performance, NASA:

- Made changes to the FY 2013 and FY 2014 plans, which are reflected in the enclosed versions;
- Reaffirmed that the cost and schedule estimation policy changes have been successful and have led to improved performance; and
- Planned more evaluation for on-going trends in areas like diversity and equal opportunity in STEM education activities.

NASA has already begun its performance management cycle for FY 2013 and will strive to improve performance at all levels of the Agency. NASA also will continue to plan, evaluate, and report in streamlined and more effective ways to provide the underpinning elements to drive this improvement.