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AUDIT REPORT

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NASA'S MANAGEMENT OF THE NPOESS PREPARATORY PROJECT

OFFICE OF INSPECTOR GENERAL

National Aeronautics and
Space Administration

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Inspector General

Acronyms

ATMS	Advanced Technology Microwave Sounder
CERES	Clouds and the Earth's Radiant Energy System
CrIS	Crosstrack Infrared Sounder
DMSP	Defense Meteorological Satellite Program
DOD	Department of Defense
DWSS	Defense Weather Satellite System
FY	Fiscal Year
GAO	Government Accountability Office
GOES	Geostationary Operational Environmental Satellites
GRAIL	Gravity Recovery and Interior Laboratory
IPO	Integrated Program Office
JPSS	Joint Polar Satellite System
MMS	Magnetospheric Multiscale
NOAA	National Oceanic and Atmospheric Administration
NPOESS	National Polar-orbiting Operational Environmental Satellite System
NPP	NPOESS Preparatory Project
NPR	NASA Procedural Requirements
OMPS	Ozone Mapping and Profiler Suite
POES	Polar-orbiting Operational Environmental Satellite
PPBE	Planning, Programming, Budgeting, and Execution
VIIRS	Visible Infrared Imaging Radiometer Suite

OVERVIEW

NASA'S MANAGEMENT OF THE NPOESS PREPARATORY PROJECT

The Issue

The National Polar-orbiting Operational Environmental Satellite System (NPOESS) Program, considered a national priority essential to meeting civilian and military weather forecasting, storm tracking, and climate monitoring requirements, was created in May 1994. The NPOESS Preparatory Project (NPP) was conceived as a risk reduction mission, providing an opportunity to demonstrate and validate new instruments; processing algorithms; and command, control, communications, and ground processing capabilities prior to launching the first of six planned NPOESS satellites. The NPP satellite was designed to carry the same instruments as NPOESS and to measure such properties as atmospheric and sea surface temperatures, humidity, land and ocean biological productivity, and cloud properties.

To manage the NPOESS Program a tri-agency Integrated Program Office (IPO) was formed and staffed by the Department of Defense (DOD), the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), and NASA. In 1999, NASA entered into an Initial Implementation Agreement with the IPO to jointly develop and manage NPP for the benefit of all involved organizations. The Final Implementation Agreement, executed in September 2004, stipulates that the individual agencies are responsible for the funding, management, and development of specific portions of NPP on a "no exchange of funds basis." [1] Because of this stipulation, each partner is responsible for all costs incurred for the mission segments under its area of responsibility.

Originally, the NPP satellite was to launch in 2006, providing NASA a platform for continuing its collection of global climatology data and creating a bridge between the NASA Earth Observing System's Terra and Aqua satellites – launched in 1999 and 2002, respectively, and designed with 6-year life spans – and the NPOESS satellites.[2] NPP's launch has now slipped to October 2011.

[1] The Initial Implementation Agreement identified partner responsibilities for the formulation phase of the effort. The Final Implementation Agreement addressed the implementation phase. A copy of the Final Implementation Agreement, effective September 17, 2004, is in Appendix B.

[2] On December 18, 1999, NASA launched Terra to begin collecting a new 18-year global data set on which to base future scientific investigations about Earth. On May 4, 2002, NASA launched Aqua to measure variables of the Earth's water cycle involving water's liquid, solid, and vapor forms. Terra and Aqua continue to operate, exceeding their designed 6-year operational life spans.

On February 1, 2010, NPOESS cost overruns and schedule delays led to a White House decision to dissolve and restructure the overarching Program. To preserve the critical operational weather and climate satellite system, NPOESS was divided into the NASA-NOAA Joint Polar Satellite System (JPSS) and the Defense Weather Satellite System (DWSS). Following the restructuring of the NPOESS Program, the value of NPP to assure continuity of essential weather and climate measurements significantly increased in importance.

We initiated this audit to determine how well NASA managed NPP to accomplish its technological objectives, meet its schedule milestones, and control costs. We also evaluated whether NPP management identified, reported, and mitigated risks. Details of the audit scope and methodology are in Appendix A.

Results

Although NASA met its schedule and technical requirements for producing the NPP spacecraft and the instruments for which it was responsible, the other IPO partners were unable to deliver their three scientific instruments to NASA in a timely manner. As a result, NPP has experienced a 5-year launch delay and a 54 percent increase in costs. Originally planned for an October 2006 launch with a life-cycle cost of $560 million, NPP is currently scheduled to launch in October 2011, and the life-cycle cost estimate has grown to $864 million.[3] Due to these delays, NASA incurred an additional $304 million in associated costs – money that could have been used for other NASA projects had NPP launched in 2006. Moreover, if the NPP launch is delayed to February 2012 – the next available launch window due to launch facility scheduling – the Project will sustain additional launch services and support costs (for example, maintaining personnel) of about $35 million. Finally, because of technical issues encountered during development and testing, NPP management is concerned that the instruments provided by the IPO may not continue to operate throughout the planned 5-year mission.

Despite Effective Project Management, NPP Costs Continue to Grow. We found that NASA had implemented sound project management principles in carrying out its NPP responsibilities. Specifically, NASA management delivered the spacecraft and the instruments for which it had responsibility on schedule and within established milestones.[4] NASA's responsibilities for NPP include providing the spacecraft and the Advanced Technology Microwave Sounder (ATMS), integrating all instruments onto the spacecraft, and providing and managing launch services.[5] Responsibilities assigned to

[3] The life-cycle costs and other costs cited throughout the report are costs to NASA and do not include DOD or NOAA costs.

[4] This report uses the terms spacecraft and satellite interchangeably to refer to NPP.

[5] Following the Nunn-McCurdy Certification of NPOESS in June 2006, NASA and NOAA recommended in a joint whitepaper that the Clouds and the Earth's Radiant Energy System (CERES) instrument that NASA built for the first NPOESS satellite be moved onto NPP to provide continuity of coverage with identical instruments on Terra and Aqua.

the IPO included providing the Crosstrack Infrared Sounder (CrIS), the Visible Infrared Imaging Radiometer Suite (VIIRS), and the Ozone Mapping and Profiler Suite (OMPS).

Due to the late delivery of instruments from the IPO, NASA project managers were confronted with unanticipated delays that caused the Agency to expend approximately $304 million that could have been used for other projects had the instruments been delivered on time and the 2006 launch date met. Moreover, the late deliveries of IPO instruments have compressed final system integration and testing activities and could delay the October 2011 launch, further increasing the launch services and support costs NASA is responsible for funding. In addition, NPP is the last of three remaining missions scheduled to launch on a Delta II launch vehicle.[6] These three missions currently share Delta II maintenance and facility costs. However, these recurring costs will be borne solely by NPP if, as expected, the other two missions proceed on schedule and NPP's launch is further delayed.

Moreover, in addition to risk reduction for NPOESS, NPP was intended to fill a gap between the expected operational life of NASA's Earth Observing System and the launch of NPOESS, thereby assuring continuity in the collection of essential weather and climate data. However, this aspect of NPP's mission could be compromised by further launch delays if NASA's Terra or Aqua satellites fail. In addition, NPP management is concerned that the operational life of the instruments supplied by the IPO may be reduced to 3 years from the original design expectation of 7 years due to the challenges the IPO encountered in their development.

Finally, because the Final Implementation Agreement between NASA, the IPO, and NOAA was executed on a "no exchange of funds" basis, each partner is responsible for all costs incurred for the mission segments assigned to it. Accordingly, NASA had to absorb the costs caused by the late delivery of instruments from the IPO. Although NASA identified late delivery of instruments by the IPO as a likely and significant risk to NPP's cost and schedule as early as January 2005, it did not seek to modify the Agreement to hold the IPO accountable for the delay costs, believing that doing so would be inconsistent with the collaborative intent of the Agreement and would only serve to further delay the Project.

Management Action

We recommended that when assessing future collaborative efforts with external partners, the Associate Administrator for the Science Mission Directorate carefully consider the technical and oversight capabilities of partner agencies and the risks associated with

[6] The other two missions are the Gravity Recovery and Interior Laboratory (GRAIL) and Aquarius. GRAIL is designed to fly two spacecraft in tandem orbits around the Moon in order to measure its gravity field. Aquarius intends to provide the first-ever global maps of salt concentrations in the ocean surface needed to understand heat transport and storage in the ocean.

agreements executed on a "no exchange of funds" basis. If a decision is made to move forward with such an agreement, NASA should ensure that its budget includes reserve levels commensurate with the associated risk.

In response to a draft of this report, the Associate Administrator for the Science Mission Directorate concurred with our recommendations and stated that the Directorate will seek to structure future partnerships to align responsibilities with technical expertise and acquisition capability while exploring reimbursable funding arrangements or a means to secure timely delivery of critical project components. In addition, the Associate Administrator stated that in partnerships executed on a "no exchange of funds" basis, NASA will track the programmatic risks and adjust reserves accordingly (see Appendix C for full Agency response).

We consider the Associate Administrator's comments to be responsive to our recommendations. The recommendations are resolved and closed.

CONTENTS

INTRODUCTION

Background

History of the National Polar-orbiting Operational Environmental Satellite System (NPOESS) and the NPOESS Preparatory Project (NPP). Polar-orbiting satellites provide data and imagery for weather forecasters, climatologists, academics, Government agencies, and the military to map and monitor changes in weather, climate, the oceans, and the environment. Since the 1960s, the United States has operated two polar-orbiting meteorological satellite systems: the Polar-orbiting Operational Environmental Satellite (POES) series, managed by the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), and the Defense Meteorological Satellite Program (DMSP), managed by the Department of Defense (DOD). Currently, one POES and two DMSP satellites are positioned to observe Earth in early morning, midmorning, and early afternoon polar orbits.[7]

With the expectation that combining the NOAA and DOD programs would reduce duplication and result in significant cost savings, in May 1994 President Clinton directed NOAA and DOD to merge the two satellite programs into a single program capable of satisfying both civilian and military requirements.[8] This combined system, known as NPOESS, was considered critical to the United States' ability to maintain the data continuity required for weather forecasting and global climate monitoring.

To manage the NPOESS Program, a tri-agency Integrated Program Office (IPO) was formed consisting of NOAA, DOD, and NASA personnel. Each agency was assigned lead responsibility for specific aspects of the NPOESS Program: NOAA for management of the merged system and satellite operations; DOD, through the Air Force, for providing the majority of the acquisition personnel and acquisition infrastructure; and NASA for facilitating development and incorporation of new technologies into the merged system.

NPP was conceived in 1998 as a risk reduction mission for the larger NPOESS Program. The NPP satellite was designed to carry several NPOESS instruments and provide the NPOESS Program with an opportunity to demonstrate and validate those instruments; processing algorithms; and command, control, communications, and ground processing capabilities prior to the first NPOESS satellite launch. In addition, launch of the NPP satellite would assure continuity of key climate measurements between the end of the

[7] The satellites are in a sun-synchronous polar orbit, which means that they pass over their targets on Earth at roughly the same local time. For example, if a morning satellite flies over Washington, D.C., at 6 a.m. Eastern time, then roughly 3 hours later it will fly over California at 6 a m. Pacific time, and later that day over Tokyo at 6 a.m. Japan Standard Time.

[8] Presidential Decision Directive/NSTC-2, May 10, 1994.

expected operational life of two existing NASA Earth-observing satellites, Terra and Aqua, and the first operational NPOESS satellite.[9]

In November 2003, NPP was baselined at a life-cycle cost of $560 million with an expected launch date of October 31, 2006. Since that time, the Project has been rebaselined two times, with a current life-cycle cost estimate of $864 million and a launch date of October 2011.[10]

Figure 1. NPP Satellite (Artist's Illustration)

Source: NASA Release No. 08-98, "Mission Operations Readiness Review for NPOESS Preparatory Project Completed," December 16, 2008, available online at http://www nasa.gov/topics/earth/features/NPOESS_prep_project html (accessed May 5, 2011).

During the period NPP was being planned and developed, the larger NPOESS Program experienced significant cost overruns and delays. By September 2005, the Program had exceeded its baseline by more than 15 percent, and again in January 2006 by more than 25 percent. As required by law, the Program formally notified Congress of these increases.[11] As a result of these cost overruns, in June 2006 the Under Secretary of Defense for Acquisition, Technology and Logistics reduced the scale of NPOESS from six to four satellites.

[9] NASA launched Terra on December 18, 1999, to begin collecting a global data set for future scientific investigations of Earth's climate. NASA launched Aqua on May 4, 2002, to measure variables of the Earth's water cycle. Terra and Aqua were designed with expected operational lives of 6 years. Both have exceeded these expectations and were still operating as of May 2011.

[10] The life-cycle costs and other costs cited throughout the report are costs to NASA and do not include DOD or NOAA costs.

[11] The Department of Defense Authorization Act for Fiscal Year 1983 (Public Law 97-252) requires congressional notification if a program's costs increase by more than 15 percent.

Over the next 3 years, NPOESS experienced additional cost and schedule slippage. Because of expected delays in the launch of NPOESS satellites, in March 2009, the NPOESS Program Executive Committee elevated NPP from a "risk reduction mission" to a "critical operational mission," meaning that the data will be used by the scientific community for numerous weather prediction models.

In June 2009, an Independent Review Team concluded that without significant managerial and funding adjustments, the NPOESS Program was unlikely to succeed and that, accordingly, there was an extreme risk to continuity of climate and weather data.[12] On February 1, 2010, President Obama announced the dissolution and restructuring of NPOESS into the Joint Polar Satellite System (JPSS) and the Defense Weather Satellite System (DWSS).

The following is a timeline of significant events in the development of NPP.

- **May 1994** – Presidential Decision Directive creating NPOESS.
- **May 1995** – NASA, NOAA, and DOD sign Memorandum of Agreement for NPOESS, which allows for a NASA research satellite to test NPOESS instruments.
- **August 1998** – The NASA Office of Earth Science reviews options for a satellite to follow the Terra and Aqua missions and serve as a demonstration satellite for NPOESS.[13]
- **November 1999** – NASA and the IPO sign Initial Implementation Agreement for NPP.
- **November 2003** – NPP is baselined at $560 million with a launch date of October 31, 2006.
- **September 2004** – NASA, IPO, and NOAA execute the Final Implementation Agreement for NPP.
- **January 2006** – NPOESS costs increase in excess of 25 percent leading to a reduction in the scale of the Program.
- **June 2006** – As a result of changes and delays associated with NPOESS, NPP's October 2006 launch date is postponed to a date "to be determined."

[12] NPOESS Independent Review Team, Final Report, June 1, 2009, available at http://democrats.science house.gov/Media/file/Commdocs/hearings/2009/Oversight/17jun/IRT_NPOESS_report.pdf (last accessed May 3, 2011).

[13] On August 1, 2004, NASA merged the Offices of Earth Science and Space Science to form the Science Mission Directorate.

- **February 2008** – NPP receives its first official rebaseline to a cost of $803 million and a June 2010 launch date.

- **March 2009** – The Program Executive Committee for NPOESS decides that NPP, rather than serving as a demonstration as originally planned, will provide data for operational use.

- **June 2009** – An Independent Review Team concludes that the NPOESS Program has an extraordinarily low probability of success and that continuity of data collection is at significant risk.

- **February 2010** – The President announces the dissolution and restructuring of NPOESS into JPSS and DWSS.

- **May 2010** – The launch date for NPP is set for October 25, 2011, with a life-cycle cost of $864 million.

- **January 2011** – NASA's Science Mission Directorate's Program Management Council reviews NPP and reaffirms the $864 million life-cycle cost and the October 25, 2011, launch date established in May 2010.

Management of NPP. Responsibility for the development of NPP's instruments is divided between NASA and the IPO. As originally planned, NASA was responsible for providing one instrument – the Advanced Technology Microwave Sounder (ATMS) – the spacecraft, integrating the instruments provided by the IPO onto the spacecraft, and providing and managing launch services. The IPO was responsible for developing and delivering to NASA three instruments: the Crosstrack Infrared Sounder (CrIS), the Visible Infrared Imaging Radiometer Suite (VIIRS), and the Ozone Mapping and Profiler Suite (OMPS).[14] Under the 2006 launch schedule, the IPO was to deliver these instruments to NASA by February 2005.

The Final Implementation Agreement between NASA and its NPP partners, executed in September 2004, stipulates that the individual agencies are responsible for the funding, management, and development of the portions of NPP assigned to them on a "no exchange of funds basis."[15] Because of this stipulation, each partner is responsible for all costs incurred for the mission segments under its area of responsibility.

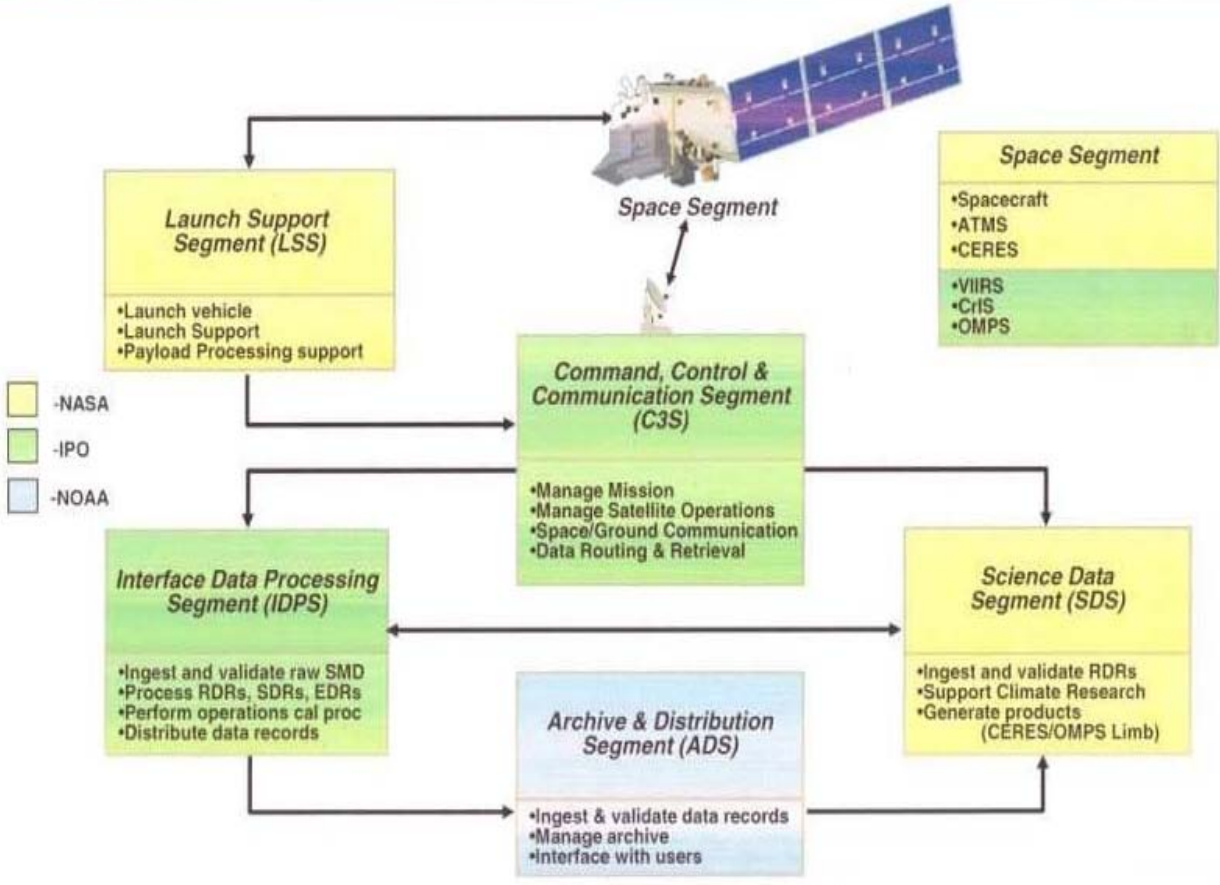
The NPP spacecraft platform was built for NASA by Ball Aerospace Technology Corporation (Ball Aerospace) under a fixed-price contract for $189.1 million and the ATMS by Northrop Grumman Aerospace Systems (Northrop Grumman) pursuant to a $197 million cost-plus-award-fee contract. In 2008, NASA added a sensor and an

[14] The OMPS consists of a Limb Sensor, a Nadir Sensor, and a Main Electrical Box.

[15] The Final Implementation Agreement is reproduced in Appendix B.

additional instrument – the Clouds and the Earth's Radiant Energy System (CERES) – to its portion of NPP. The CERES instrument was built for NASA by Northrop Grumman unrelated to NPP and had been in storage since 1999. NASA prepared CERES for flight on the NPP satellite at a cost of approximately $19 million.[16] The NPP spacecraft, instruments, and partner responsibilities are illustrated in Figure 2.

Figure 2. NPP Mission Segments and Responsibilities



EDRs - Environmental Data Records
RDRs - Raw Data Records
SDRs - Sensor Data Records
SMD - Stored Mission Data

Source: NASA NPP Overview, July 20, 2010.

NPP was initially baselined in November 2003 with a life-cycle cost estimate of $560 million and a launch date of October 31, 2006. Due to late delivery of instruments from the IPO, NPP was rebaselined in February 2008 to a life-cycle cost estimate of $803 million and a launch date of June 2010 – a 43 percent cost increase and a 3-year schedule delay.

[16] The full cost of CERES was $52.4 million – $27.6 million from NOAA, $19.4 million from NPP, and $5.4 million from the Science Mission Directorate.

NPP was subject to a second rebaseline review in November 2010. On January 21, 2011, the Science Mission Directorate's Program Management Council approved NPP's second rebaseline, with a revised life-cycle cost estimate of $864 million ($61 million increase) and a launch date of October 25, 2011 (additional delay of 2 years). The current project schedule provides for completion of ground system integration and testing 14 days prior to the October 25 launch date. Assuming the Project meets the launch date, NPP will have incurred a 5-year launch delay and a 54 percent overall life-cycle cost increase since the initial Program Commitment Agreement in 2003. Table 1 summarizes the intended and actual delivery dates for the instruments and spacecraft, as well as the rationale for the delays.

Table 1. Instrument Delivery Dates and Rationale for Late Deliveries

Instrument	Provider	Original Delivery Date	Actual Delivery Date	Delay (months)	Rationale
ATMS	NASA	January 2004	October 2005	21	Due to the late delivery of the other instruments, NASA delayed development to phase delivery accordingly.
CrIS	IPO	April 2004	June 2010	74	Multiple failures during vibration testing. Circuit design failures took 1.5 years to resolve.
VIIRS	IPO	September 2004	December 2009	63	Technical failures and design issues.
Spacecraft	NASA	November 2004	June 2005	7	Modifications to the spacecraft from addition of CERES and significant delays with the VIIRS and CrIS.
OMPS	IPO	February 2005	November 2008	45	Suffered from funding issues because of VIIRS and CrIS.
CERES	NASA	October 2008	October 2008	0	Added by NASA to ensure continuity of data collected by Aqua.
Ground System	IPO	March 2006	July 2009	40	System integration and testing identified performance issues, data loss, and inconsistencies in the technical baseline.

NPP is the last mission scheduled to launch aboard a Delta II launch vehicle. If the launch is delayed, the Project could find itself responsible for full costs of maintenance of the Delta II launch facilities and operations, which would cause additional increases to the overall mission cost. If NPP misses the October 2011 launch date and launches in February 2012 (the next available launch date due to launch schedule conflicts), NASA estimates the cost of the Project will increase by approximately $35 million for a total $899.3 million in life-cycle costs.

Objectives

The overall objective of this audit was to determine how well NASA managed NPP to accomplish its technological objectives, meet its schedule milestones, and control costs. We also evaluated whether NPP management identified, reported, and mitigated risks. See Appendix A for details of the audit's scope and methodology, our review of internal controls, and a list of prior coverage.

NPP HAS BEEN ADVERSELY IMPACTED BY FACTORS OUTSIDE NASA'S CONTROL

Although NASA met its schedule and technical requirements for the NPP spacecraft and instruments for which it was responsible, the IPO was unable to deliver its instruments to NASA in a timely manner and the Project therefore experienced significant schedule disruption. As a result, NASA incurred approximately $304 million in additional costs for NPP – money that otherwise would have been available to fund other NASA projects. Because the NPP Final Implementation Agreement was executed on a "no exchange of funds" basis, NASA rather than the IPO absorbed these costs. Moreover, delays and cost overruns suffered by the larger NPOESS Program further increased NASA's costs for NPP, and the resultant restructuring of NPOESS delayed NPP's launch; additional delays could result in a gap in data collection. In addition, because NPP is the last mission scheduled to use a Delta II launch vehicle, delay of the launch beyond October 2011 would result in NASA absorbing additional cost increases for launch services. Finally, the IPO instruments' development challenges may affect the viability of NPP's 5-year mission.

NPP's Development and Launch Was Compromised by the IPO's Late Delivery of Instruments

We determined that NASA took appropriate steps to ensure NPP was on schedule and met technical requirements. Specifically, managers implemented an earned value management system to track the development of ATMS and CERES and, in accordance with NASA requirements, implemented risk management procedures to identify, analyze, track, and communicate associated risks.[17] By November 2005, NASA had completed ATMS, had integrated it onto the spacecraft, and was on schedule for the planned October 2006 launch. However, the IPO failed to deliver its three instruments to NASA for integration by November 2005 as planned. When the IPO still had not delivered the instruments by June 2006, it became apparent to NASA management that an October 2006 launch would not be possible.

To the extent possible, NASA management took steps to mitigate the impact of the IPO delivery delays. Specifically, rather than wait to perform risk reduction tests on the IPO instruments during the integration phase of the Project as originally planned, NASA performed these tests when the individual instruments were delivered to it. The IPO delivered the OMPS Nadir Sensor in November 2008, the VIIRS instrument in January

[17] NASA Procedural Requirements (NPR) 8000.4A, "Agency Risk Management Procedural Requirements," December 16, 2008.

2010, and the CrIS instrument in June 2010, and all instruments had been integrated onto the NPP spacecraft by September 2010.

Final Implementation Agreement Makes Each Partner Responsible for Individual Mission Segments

The Final Implementation Agreement between NASA, the IPO, and NOAA was executed on a "no exchange of funds" basis and does not impose financial liability on a partner that encounters challenges that directly increase costs for another partner. Accordingly, regardless of fault, each partner is responsible for all costs incurred for the mission segments under its area of responsibility.

Under the Agreement, NASA is responsible for the spacecraft, the ATMS instrument, instrument integration, launch support, and the science data segment.[18,19] The IPO is responsible for the CrIS, VIIRS, and OMPS instruments; the command, control, and communications segment; and the interface data processing segment. Technical problems and late delivery of the CrIS and VIIRS instruments and the OMPS Nadir Sensor directly affected NASA, increasing contract costs by $74.7 million and delaying NPP's launch by 5 years. Specifically, NASA incurred an additional $62.6 million in costs under the spacecraft contract with Ball Aerospace and approximately $12 million more under the ATMS contract with Northrop Grumman as a result of late deliveries of the IPO instruments and associated launch delays.

"Article V – Amendment and Termination" of the Final Implementation Agreement provides that the agreement "may be amended at any time upon the mutual consent of the parties." NASA managers responsible for NPP told us that as technical problems and launch delays increased, they discussed with NASA Headquarters officials whether they should seek to amend the Final Implementation Agreement to include language that would make the responsible partners liable for funding the cost of any delays; however, the Agreement was not revised.

When we asked NASA officials why they did not seek to revise the Agreement, they stated that parties enter into this type of agreement in the spirit of collaboration, recognizing that such agreements can produce mutual benefits that would not be possible when working alone. NASA officials said that including language to make partners liable for the cost of delays would be contrary to the collaborative intent of the agreements and could result in a partner's refusal to participate. This, in turn, would have a detrimental impact on NASA's ability to accomplish missions that require effective partnerships to meet shared requirements. Ultimately, NASA Headquarters officials said they did not

[18] The Implementation Agreement did not include the CERES instrument, which was added to the Project in 2008 by NASA.

[19] The science data segment is a research tool for assessing and verifying the quality of NPP data.

pursue an amendment to the NPP Implementation Agreement because the IPO was already expending the majority of its funds on NPP and any effort to recoup the additional delay costs from the IPO would likely have led to additional delays.

We reviewed memorandums of agreement for other NASA partnerships, including NASA's Geostationary Operational Environmental Satellites (GOES and GOES-R) and Aquarius missions to determine whether they included cost-sharing provisions in the event of schedule delays caused by partner organizations.[20] We found that similar to the NPP Implementation Agreement these agreements do not include such provisions.

Delays and Cost Overruns for NPOESS Further Increased NASA's Costs for NPP

By January 2006, the baseline for NPOESS had been exceeded by at least 25 percent. As a result, five sensors originally planned for the NPOESS satellites were eliminated from the NPOESS Program and accordingly from NPP. However, NASA scientists believed that the ozone monitoring capabilities of one of the eliminated sensors – the OMPS Limb Sensor – were critical to NPP's science mission. In addition, another of the eliminated sensors would have collected data relating to the Earth's radiation balance. In order to maintain continuity of this data, NASA decided to include the CERES instrument on the NPP satellite rather than on a later NPOESS flight as had originally been planned. Accordingly, in June 2008 NASA rebaselined NPP to include the OMPS Limb Sensor and the CERES instrument with a launch readiness date of June 2010.

By the fiscal year (FY) 2010 Planning, Programming, Budgeting, and Execution (PPBE) review, the NPP budget had increased by $304 million to $864 million, a 54 percent increase since the 2003 Program Commitment Agreement.[21] We determined that $213 million of this increase is attributable to the IPO's failure to provide instruments in a timely manner. NASA's decision to take responsibility for the OMPS Limb Sensor after it had been eliminated from the NPOESS Program and to add CERES cost NASA an additional $12 million and $19 million, respectively. The remaining approximately $60 million is attributable to improvements and other adjustments NASA made to the Project while it was awaiting delivery of the instruments from the IPO (see Table 2).

[20] GOES and GOES-R collect weather data while Aquarius measures global sea surface salinity.

[21] The PPBE process is a methodology for aligning resources in a comprehensive, disciplined, top-down approach.

Table 2. NPP Cost Increases
(in millions, rounded)

NPP Cost Increases	Cost at MCR November 2003*	Increase from MCR to PPBE FY10	NPP Total Life-Cycle Cost
Delay Costs	$ -	$ 212.61	$ 212.61
NASA Costs and Opportunities:			
Ground System Updates	$ 29.70	$ 14.62	$ 44.32
ATMS Improvements	$ 154.50	$ 40.68	$ 195.18
OMPS Limb/Re-Manifest	$ -	$ 12.20	$ 12.20
CERES Addition	$ -	$ 19.38	$ 19.38
Project Support	$ 51.60	$ 25.87	$ 77.47
Spacecraft Updates	$ 137.00	$ 2.28	$ 139.28
Contingency Costs	$ 53.90	$ (35.91)	$ 17.99
Budget Restructures:			
Mission Science Team	$ -	$ 9.07	$ 9.07
General and Administrative; Maintenance and Operations; and Institutional Investments	$ 14.30	$ (2.40)	$ 11.90
Full Cost	$ 41.80	$ 5.96	$ 47.76
Launch Services	$ 77.30	$ (0.13)	$ 77.17
Total	$ 560.10	$ 304.23	$ 864.33

*MCR - Mission Confirmation Review

Source: NPP Deputy Project Manager, Resources

Launch Delay to 2012 Would Increase NPP's Launch Services Costs

NPP will be launched on a Delta II rocket. Currently, only two other missions, Aquarius, planned for launch in June 2011, and the Gravity Recovery and Interior Laboratory (GRAIL), planned for launch in September 2011, are scheduled to use a Delta II launch vehicle before that program is scheduled to be retired. The three missions equally share the post-production support costs and launch services contract costs of the Delta II program through the end of calendar year 2011.[22] In addition, NPP and Aquarius, which will both launch from Vandenberg Air Force Base in California, share launch pad maintenance costs until June 2011.

[22] Post-production support costs ensure that subcontractors with the knowledge and expertise needed to manufacture or repair subcomponents are available if needed.

Both Aquarius and GRAIL are expected to launch on schedule. If NPP does not, the Project will face increased launch costs. Because of a crowded launch schedule in late 2011, if NPP misses its October 2011 launch date, the next possible launch date is February 2012, which will cost NASA about $35 million in additional costs. These costs comprise approximately $4.8 million per month in Project costs (for example, maintaining personnel) for a total of $19.2 million. Moreover, NPP would also bear a portion of the maintenance costs for the Vandenberg Delta II launch pad (approximately $14 million per year), Delta II post-production support costs (approximately $7 million per year), and launch services contract costs (approximately $14 million per year). These additional costs attributed to the launch vehicle and services are estimated to be $15.8 million for a February 2012 launch. If the launch is further delayed, NASA's costs would continue to increase.

Delay in NPP Launch Schedule Could Result in a Gap in Data Continuity

As previously noted, the President announced the restructuring of NPOESS into JPSS and DOD's DWSS on February 1, 2010. With regard to JPSS, NASA acts as the acquisition agent and is responsible for procuring and launching the satellites. NOAA is responsible for operating, collecting, and distributing the data collected by the satellites as well as funding and providing JPSS requirements. To mitigate the risk of a gap in climate data collection between the Terra and Aqua satellites and launch of the JPSS satellites, NPP needs to launch as soon as possible.

However, as part of the restructuring of NPOESS, ground system contracts were to be transferred from the Air Force to JPSS. This caused further delays in delivery of the NPOESS/NPP ground system to NASA for integration. In addition, NASA and NOAA had to work with the Air Force and Northrop Grumman to obtain the instrument and ground system hardware and contracts. In November 2010, the ground system hardware and contracts were transferred to JPSS.

NPP management stated that it typically takes 15 months to perform ground system integration and testing after integration of the last instrument, which for NPP occurred in June 2010. Although in theory this schedule would allow for an October 2011 launch, NPP management told us that they expect to encounter ground system integration issues that may take longer to resolve and that therefore could cause the launch to be delayed beyond October.

Concern that the Quality of the IPO Instruments May Affect the NPP Mission

The IPO was responsible for development and delivery of the CrIS and VIIRS instruments and the OMPS Nadir Sensor. According to NPP management, these instruments were developed in "an undisciplined environment" and experienced technical and structural challenges that compromised their integrity. For example, continuing challenges with development of the VIIRS instrument caused the IPO to turn to the Goddard Space Flight Center for assistance, and the CrIS instrument experienced a broken frame during a vibration test and additional parts were damaged during repair. The potential life expectancy of both VIIRS and CrIS was 7 years, 2 years beyond NPP's planned 5-year mission. However, because of the challenges in development and testing, NPP management has expressed concern that the design life of these instruments could be reduced to 3 years, which would threaten NPP's 5-year mission plan.

Challenges Associated with Collaborations

In 2010, the National Research Council's Committee on Assessment of Impediments to Interagency Collaboration on Space and Earth Science Missions found that "candidate projects for multiagency collaboration in the development and implementation of Earth-observing or space science missions are often intrinsically complex and, therefore costly, and that a multiagency approach to developing these missions typically results in additional complexity and cost."[23] The Committee also found that "advocates of collaboration have sometimes underestimated the difficulties and associated costs and risks of dividing responsibility and accountability between two or more partners; they also discount the possibility that collaboration will increase the risk in meeting performance objectives."

The Government Accountability Office (GAO) has reported on several projects on which NASA experienced challenges with partners not meeting commitments within planned funding levels and established schedules.[24] NPP was specifically cited as one such project. Other NASA projects the GAO discussed included Aquarius and the Magnetospheric Multiscale (MMS). Aquarius experienced delays in development that increased NASA's costs by $35.5 million and extended the launch schedule 23 months. For MMS, a lack of funding for instrument production by an international partner cost NASA $6 million to transfer the work to a domestic partner.

[23] "Assessment of Impediments to Interagency Collaboration on Space and Earth Science Missions," 2010, National Research Council Assessment, available at http://www.nap.edu/catalog.php?record_id=13042#toc (last accessed May 3, 2011).

[24] "NASA: Assessments of Selected Large-Scale Projects" (GAO-11-239SP, March 2011).

Recommendations, Management's Response, and Evaluation of Management's Response

When assessing future collaborative efforts with external partners, we recommend that the Associate Administrator for the Science Mission Directorate take the following actions:

Recommendation 1. Carefully consider the technical and oversight capabilities of partner agencies and the risks associated with agreements executed on a "no exchange of funds" basis.

Management's Response. The Associate Administrator for the Science Mission Directorate concurred with the recommendation and stated that the Directorate will seek to structure future partnerships in a way that aligns responsibilities with both technical expertise and acquisition capability. The Associate Administrator also stated that the Directorate will "studiously avoid other similarly misaligned partnerships" with interagency program offices and explore the use of reimbursable funding arrangements for non-space agency partners that would allow the Directorate to secure timely delivery of critical project components.

Evaluation of Management's Response. Management's proposed actions are responsive; therefore, the recommendation is resolved and closed.

Recommendation 2. If a decision is made to move forward with such an agreement, ensure that the budget includes reserve levels commensurate with the associated risk.

Management's Response. The Associate Administrator for the Science Mission Directorate concurred with the recommendation. However, in his response he commented that a "no exchange of funds" agreement may be the only practical course for agencies that have trouble funding their own deliverables and therefore are likely to have even more trouble funding costs incurred by NASA due to delays on the partners' end. The Associate Administrator said NASA would track these programmatic risks and adjust its reserve levels accordingly.

Evaluation of Management's Response. Management's proposed actions are responsive; therefore the recommendation is resolved and closed.

APPENDIX A

Scope and Methodology

We performed this audit from June 2010 through May 2011 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

We reviewed planning, financial, and scheduling documents; NPP contracts; and risk management plans, as well as criteria for project management, and earned value management. We conducted interviews with project officials to determine whether NASA effectively managed NPP in support of NPOESS/JPSS to accomplish its technological objectives while meeting established milestones and controlling costs. We also reviewed internal controls as they related to the overall audit objective. The budget documents available for review were the November 2003 Program Commitment Agreement; the "Program Operating Plan 06-1 New Obligation Authority/Cost Summary" for FY 2006; and the "Planning, Programming, Budgeting, and Execution 10-1 New Obligation Authority/Cost Summary" for FY 2010, which we also reviewed to determine whether NPP was controlling costs. In addition, we reviewed the NASA Science Mission Directorate's Program Management Council Project Decision Agreement, January 21, 2011.

We reviewed the NPP Project Plan (GSFC 429-02-01-07, July 12, 2005) and compared it to the Monthly Status Reports through September 2010. We found that NPP management, to the extent possible and within the confines of the September 2004 Final Implementation Agreement between NASA, the IPO, and NOAA, effectively monitored and managed the Project. In addition, we reviewed NASA project management criteria, NPR 7120.5D, "Space Flight Program and Project Management Requirement," March 6, 2007, to determine whether the Project was within NASA guidelines.

We reviewed the NPP Risk Management Plan (GSFC 429-99-01-04, January 21, 2000); interviewed the NPP Project Manager, NPP Deputy Project Manager, Mission Systems Engineer/Risk Coordinator, NPP Chief Engineer, and Chief Safety and Mission Assurance Officer; and reviewed the NPP risk database to determine whether NPP management was effectively identifying, reporting, monitoring, and mitigating risks in accordance with NPR 8000.4A, "Agency Risk Management Procedural Requirements," December 16, 2008, which is required to be implemented by every NASA project.

We reviewed instrument, spacecraft, and launch services contracts and interviewed NPP Contracting Officers, Senior Program Officials of the Launch Services Program/Program Business Office, and the Chief of Procurement for Launch Services.

In addition, we interviewed the JPSS Deputy Program Manager and the JPSS Chief Engineer to determine any impacts to JPSS due to the delayed launch of NPP and confirmed that a delay in NPP's launch would increase the risk of a data gap if the current operational satellites became nonoperational.

Use of Computer-Processed Data. We used an NPP Project Risk Information Management eXchange report to determine that NPP had a risk database and that it was implemented in accordance with NPR 8000.4A. However, we did not validate the accuracy of the data in the NPP Project Risk Information Management eXchange report.

We also used a management-prepared NPP Budget New Obligation Authority Summary of life-cycle costs and cost increases. We verified the costs by comparing them with other source documents (see list below). From the comparison, we determined that the management-prepared NPP Budget New Obligation Authority Summary data was credible.

- NPP New Obligation Authority Budget Plan from the 2003 Mission Confirmation Review Presentation
- Program Operating Plan 03-1 Working Summary
- NPP New Obligation Authority Summary Program Operating Plan 04-1 Final
- NPP FY 2009 Budget Request
- NPP Mission Science Team Reconciliation of Guideline and Program Operating Plan 06-1 New Obligation Authority Submit
- NPP Spacecraft Contract PPBE Program Operating Plan 10-1 Cost Requirement
- ATMS Instrument Contract History
- Program Operating Plan 06-1 New Obligation Authority/Cost Summary
- PPBE 10-1 New Obligation Authority/Cost Summary
- NPP FY 2008 Congressional Budget
- NPP FY 2011 Office of Management and Budget Submission Narrative Update, January 2011
- NPP Monthly Launch Slip Estimate

Review of Internal Controls

We reviewed NPP policies, procedures, and internal controls to determine whether NPP had implemented appropriate internal controls related to NPP management, risks, lessons learned, and administration of contracts for compliance with NASA regulations. We found that NPP management had implemented an effective process to identify, document, evaluate, mitigate, and administer contract responsibilities in accordance with NASA and NPP oversight criteria. Specific internal controls reviewed included:

- NPP Project Plan, GSFC 429-02-01-07, July 12, 2005
- NPP Risk Management Plan, GSFC 429-99-01-04, January 21, 2000
- NPR 8000.4A, "Agency Risk Management Procedural Requirements," December 16, 2008
- NPR 7120.6, "Lessons Learned Process (Revalidated w/change 1, 01/22/10)"
- NPR 7120.5D, "NASA Space Flight Program and Project Management Requirement," March 6, 2007
- ANSI/EIA-748-B-2007, "Earned Value Management Systems," September 10, 2007

Prior Coverage

During the last 5 years, NASA has not issued a report of particular relevance to the subject of this report. The GAO has issued five reports, listed below, that describe significant impacts to NPP due to escalating costs, schedule delays, and ineffective management of the NPOESS Program and its restructure to JPSS as the cause for NPP launch delays and cost growth. Unrestricted reports can be accessed over the Internet at http://www.gao.gov.

"NASA: Assessments of Selected Large-Scale Projects" (GAO-11-239SP, March 2011)

"Polar-Orbiting Environmental Satellites: Agencies Must Act Quickly to Address Risks That Jeopardize the Continuity of Weather and Climate Data" (GAO-10-558, May 2010)

"NASA: Assessments of Selected Large-Scale Projects" (GAO-10-227SP, February 2010)

"Polar-Orbiting Environmental Satellites: With Costs Increasing and Data Continuity at Risk, Improvements Needed in Tri-agency Decision Making" (GAO-09-564, June 2009)

"Environmental Satellites: Polar-orbiting Satellite Acquisition Faces Delays; Decisions Needed on Whether and How to Ensure Climate Data Continuity" (GAO-08-518, May 2008)

FINAL IMPLEMENTATION AGREEMENT

FINAL IMPLEMENTATION AGREEMENT

BETWEEN

THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

OFFICE OF EARTH SCIENCE (OES)

AND

NATIONAL POLAR-ORBITING OPERATIONAL ENVIRONMENTAL SATELLITE SYSTEM (NPOESS) INTEGRATED PROGRAM OFFICE

AND

THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) NATIONAL ENVIRONMENTAL SATELLITE DATA INFORMATION SERVICE

FOR THE

NPOESS PREPARATORY PROJECT (NPP)

I. PURPOSE

The Office of Earth Science (OES) of the National Aeronautics and Space Administration (NASA), the National Oceanic And Atmospheric Administration's (NOAA) National Environmental Satellite Data and Information Service (NESDIS), and the National Polar orbiting Operational Environmental Satellite System (NPOESS) Integrated Program Office (IPO), hereby agree to enter into a partnership to jointly implement a mission called the NPOESS Preparatory Project (NPP) to accomplish the following objectives:

1. Demonstrate and validate:
   a. A global imaging radiometer and a suite of two sounding instruments, associated algorithms, and data processing
   b. An ozone mapping and profiling instrument, associated algorithms, and data processing
   c. A NPP Command, Control and Communications segment (C3S), an Interface Data Processing Segment (IDPS), an Archive and Distribution Segment (ADS), and a Science Data Segment (SDS)

2. Provide continuity of the calibrated, validated and geo-located EOS Terra and Aqua systematic global imaging radiometry, sounding observations, and ozone mapping and profiling observations for NASA Earth Science research.

1

NPP will provide scientific measurements which meet a subset of the NASA Earth Science Enterprise science needs, as well as those of the NPOESS Program. It is planned to launch in 2006, with a mission duration on-orbit of at least 5 years. The instruments flown on this mission will also be flown and operated on the NPOESS.

This Final Implementation Agreement (FIA) identifies the respective partners' responsibilities to be used for the implementation phase of the mission, and supercedes the NPP Initial Implementation Agreement (IIA), dated November 21, 1999. This is in accord with the policy and procedures set forth in Appendix 1 of the "Memorandum of Agreement" Between the Department of Commerce, Department of Defense and the National Aeronautics and Space Administration for the National Polar-orbiting Operational Environmental Satellite System, dated May 26, 1995.

NOTE: "NPP Mission Data" in this document includes instrument raw data records, sensor corrected data records, and environmental data records with supporting ancillary data, telemetry, etc required to process the data.

Ia. AUTHORITY

The NPOESS IPO and NOAA/NESDIS are authorized to enter into this agreement pursuant to 15 USC § 313 and 49 USC § 44720, since it supports NOAA's mission to predict and forecast weather and climate. NASA is authorized to enter into this agreement pursuant to the sections 203 (c) (5) and (6) of the National Aeronautics and Space Act, 42 USC §2473 (c) (5) and (6).

II. RESPONSIBILITIES

NASA OES and IPO will jointly manage the project, and NOAA/NESDIS will manage the ADS. NASA OES, NOAA/NESDIS and NPOESS IPO assume the following division of responsibilities.

NPOESS IPO will:

1. Provide and manage the development of the Cross-track Infrared Sounder (CrIS), Visible-Infrared Imager Radiometer Suite (VIIRS) and the Ozone Mapping and Profiler Suite instruments, and deliver them to the NPP spacecraft contractor.

2. Provide and manage the development of C3S and IDPS.

3. Provide and manage the Missions Management Center (MMC) for NPP pre-launch, launch, early orbit, and operations phases of the mission.

4. Provide the resources and facilities to exercise command and control of NPP during launch, early orbit and on-orbit acceptance testing, in conjunction with NASA OES planning and management.

5. Exercise Satellite Control Authority (SCA) after NPP on-orbit acceptance, and for the remainder of the mission. SCA is the authority to direct, approve, perform and/or delegate all Satellite command and control activities to maintain the Satellite in a mission-capable operating configuration.

6. Plan satellite launch and on-orbit acceptance activities in cooperation with OES.

7. Provide and manage the development and operation of the ground assets needed to support mission operations, including data receiving systems, primary telemetry and command systems, network services for data and data products, and the IDPS. IPO will provide these assets and services for the life of the mission.

8. Provide for NPP mission data and data product's global, continuous production and distribution beginning at satellite acceptance.

9. Provide support to OES for NPP operational readiness testing, pre-launch, launch, on-orbit satellite acceptance, and the transitional engineering.

10. In conjunction with OES, jointly conduct operational readiness testing with all ground elements.

11. Support NPP instrument and system calibration and validation during hardware development, integration and test, pre-launch, launch, satellite acceptance, and transition phase in cooperation with NASA.

12. Provide prototype software (algorithms and support tools) to OES for integration into the NASA-built NPP in-situ ground system's Direct Broadcast terminal.

13. Provide technical representation for OES-managed NPP reviews and products.

14. Provide for NPP instrument contractor support after handover from NASA to IPO.

15. In cooperation with NASA, provide command and control, telemetry, and mission data recovery from the Svalbard Ground Station to the US point of presence.

NASA's OES will:

1. Provide and manage overall mission systems engineering.

2. Provide and manage the development and procurement of the spacecraft bus, including the integration and test of the instruments onto the satellite, and a spacecraft simulator for use by IPO.

3. In conjunction with IPO, jointly conduct operational readiness testing with all ground elements.

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4. Provide and manage the development and procurement of the Advanced Technology Microwave Sounder (ATMS). Support transition of ATMS follow-on production responsibility to the IPO system integration contractor.

5. Provide and manage the development of the SDS.

6. Provide and manage launch services.

7. Manage SCA planning and execution, in conjunction with IPO at the MMC, during pre-launch, launch and on-orbit acceptance testing until Satellite turnover.

8. Coordinate transition of the NPP mission operations to the IPO after on-orbit satellite acceptance is complete.

9. Provide emergency NPP anomaly resolution support as available, to the IPO after on-orbit acceptance and through mission life.

10. Provide scientific research to evaluate the quality of the IDPS-produced NPP EDRs for climate research, and provide updated algorithms to the NPOESS IPO for potential inclusion in the IDPS.

11. Provide scientific support for NPP instrument and system calibration and validation during hardware development, integration and test, pre-launch, launch, satellite acceptance, and transition phase, as necessary.

12. Conduct calibration and validation for NASA-provided instrument.

13. In cooperation with IPO, coordinate communications services and backup connectivity requirements needed to support NPP operations. Support IPO in obtaining backup command and telemetry capability via TDRSS and the White Sands Ground Station.

14. Provide technical representation for IPO-managed NPP reviews and products.

NOAA/NESDIS will:

1. Provide the NPP ADS for long-term archive and timely distribution of all NPP Mission Data.

2. Provide ADS access, interface, and data for the NPP SDS in accordance with ICDs to be negotiated between NASA OES and NOAA/NESDIS.

3. Coordinate with NASA and IPO on all scheduling, pre-launch development, testing and reviews of the ADS in the end-to-end mission.

Program Management:

OES and IPO will jointly assume program management responsibilities, and develop integrated performance milestones to be achieved for the implementation and operation

of the mission. Potential changes involving the NPP launch readiness date, costs, or system performance will be promptly communicated between the parties (e.g., Tri-Agency Steering Committee/NPOESS Executive Committee). Any proposed changes in instrument performance parameters that affect NPOESS operational or OES scientific data products requirements will be mutually agreed to by the parties or their designees. The NPP Project and the IPO will jointly report status at appropriate reviews.

All pre-launch, launch and on-orbit activities will be conducted from an IPO-provided MMC. The Satellite will transition from on-orbit acceptance testing to nominal Satellite operations approximately 90 days after Satellite launch. OES and the IPO will mutually determine exactly when the Satellite transition occurs. At that time, SCA authority will be formally transferred from OES to the IPO.

OES and IPO will accept a voting member from the other party on the Fee Determination Board for the NPOESS and ATMS contracts through acceptance of the NPP Satellite, and remainder of the mission as necessary. With respect to the NPP Satellite, OES will accept a member from IPO in the milestone payment determination process.

OES and IPO will document and implement a single joint Configuration Control Board for all elements of the NPP mission pertaining to Level II requirements, element interfaces (Interface Requirements Documents), and NPP instrument specifications.

OES and IPO will maintain a shared Master Schedule, at the instrument and major end-item level, which supports the launch date in this document. Any changes in this delivery schedule of these items will be communicated to the parties or their representatives.

OES and IPO will consult promptly with each other on all issues involving interpretation or implementation of this Final Implementation Agreement. Any outstanding issues will first be referred to the Program Managers of the parties, then to the appropriate FIA signatories, or their designees.

OES, NOAA and IPO will share cost, schedule and mission justification information with all parties of the NPP Program, as necessary.

III. FUNDING

This program will be executed on a no exchange of funds basis. All activities pursuant to this FIA are subject to the availability of appropriated funds, and no provision herein shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C. §1341. This FIA is not a funding document, and does not represent the obligation or transfer of funds.

Each party shall support the other in the appropriation process and shall reconsider this agreement should conditions merit.

IV. PRINCIPAL POINTS OF CONTACT

The principal points of contact with responsibility for implementing this FIA are listed below:

For NASA:
Mr. Andrew Carson
NPP Program Executive
Office of Earth Science
National Aeronautics and Space Administration
Code YF
300 E Street SW
Washington, DC 20024
(202) 358-1702

For IPO:
Peter Wilczynski
NPP Program Manager
Integrated Program Office
8455 Colesville Road, Suite 1450
Silver Spring, MD 20910
(301) 713-4786

For NOAA:
Charles Wooldridge
NESDIS Chief of Staff
1335 East-West Highway
SSMC1, Room 8340
Silver Spring, MD 20910
(301) 713-3578

For Air Force:
Major Deborah Werling
Weather Satellite Element Monitor
SAF/USAE
1060 Air Force Pentagon
Washington, DC 20330
(703) 588-7387

V. AMENDMENT AND TERMINATION

This FIA may be amended at any time upon the mutual consent of the parties. Amendments must be in writing, and signed by the authorized representatives of the parties.

This FIA will terminate automatically upon completion of the NPP. The parties may amend this FIA pursuant to the preceding paragraph to extend the termination date. A party may terminate its participation in this FIA at its sole discretion, subsequent to providing 120 days advance written notice to the other parties.

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VI. EFFECTIVE DATE

This FIA shall be effective upon the date of the last signature below, and shall remain in effect through the end of the mission life.

Concur:

John D. Cunningham
System Program Director
NPOESS Integrated Program Office
Date: 28 Jul 2004

Approved:

Ghassem R. Asrar
Associate Administrator for
Earth Science,
National Aeronautics and
Space Administration
Date: 7/28/04

Gregory W. Withee
Assistant Administrator for
Satellite and Information Services
National Oceanic and
Atmospheric Administration
Date: 20 Aug 04

Robert S. Dickman
Deputy for Military Space
Office of the Under Secretary
of the Air Force
Date: 17 SEP 04

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Acronyms

ADS	Archive and Distribution Segment
ATMS:	Advanced Technology Microwave Sounder
C3S:	Command Control and Communications Segment
CrIS:	Cross track Infrared Sounder instrument
EDR	Environmental Data Record
EOS:	Earth Observation System
ERBS:	Earth Radiation Budget Sensor instrument
FIA:	Final Implementation Agreement
IDPS:	Interface Data Processing Segment
IIA:	Initial Implementation Agreement
IPO:	Integrated Program Office
LEO:	Launch and Early Orbit
MMC:	Mission Management Center
NASA:	National Aeronautics and Space Administration
NESDIS:	National Environmental Satellite, Data Information Service
NOAA:	National Oceanic and Atmospheric Administration
NPOESS:	National Polar-orbiting Operational Environmental Satellite System
NPP:	NPOESS Preparatory Project
OES:	Office of Earth Science
RDR:	Raw Data Record
SCA:	Satellite Control Authority
SDS:	Science Data Segment
SMD:	Stored Mission Data
VIIRS:	Visible-Infrared Imager Radiometer Suite instrument

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MANAGEMENT COMMENTS

National Aeronautics and Space Administration
Headquarters
Washington, DC 20546-0001

MAY 31 2011

Reply to Attn of: SMD/Strategic Integration and Management Division

TO: Assistant Inspector General for Audits

FROM: Associate Administrator for Science Mission Directorate

SUBJECT: OIG Draft Report, "NASA's Management of the NPOESS Preparatory Project" (Assignment No. A-10-012-00)

The Science Mission Directorate appreciates the opportunity to review and provide comments on your draft audit report entitled "NASA's Management of the NPOESS Preparatory Project" (Assignment No. A-10-012-00). In the draft report, the Office of the Inspector General (OIG) makes two recommendations directed to the Science Mission Directorate. NASA's response to the OIG's recommendations follows.

Recommendation 1: When assessing future collaborative efforts with external partners, the Associate Administrator for the Science Mission Directorate should carefully consider the technical and oversight capabilities of partner agencies and the risks associated with agreements executed on a "no exchange of funds" basis.

Management's Response: Concur. The Science Mission Directorate (SMD) will seek to structure future partnerships in a manner that carefully aligns responsibilities with both technical expertise and acquisition capability. In the case of the NPOESS Preparatory Project, NASA's partnership was not with an agency, but with an interagency program office that had its own now well-documented responsibility misalignments. SMD will studiously avoid other similarly misaligned partnerships with interagency program offices in the future. Where the prospective partner is not a space agency, NASA will explore the use of reimbursable funding arrangements or means and terms of collaboration that allow SMD to secure the timely delivery of critical path items. The process of planning, drafting, and negotiating agreements with prospective partners affords an opportunity for thorough consideration of equity and capability alignments and risks, as well as review by other NASA Headquarters offices that can provide useful advice on such matters.

Recommendation 2: If a decision is made to move forward with such an agreement, ensure that the budget includes reserve levels commensurate with the associated risks.

Management's Response: Concur. The "no exchange of funds" principle may often be the only practical course, as partner agencies having trouble funding their deliverables are likely to have even more trouble funding costs incurred by NASA due to delays on their end. Especially in cases of "no exchange of funds" partnerships, NASA will track the associated programmatic risks and adjust reserve levels accordingly.

Thank you again for the opportunity to review and comment on the draft audit report.

Charles Kay
for Edward J. Weiler

REPORT DISTRIBUTION

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Deputy Administrator
Chief of Staff
NASA Advisory Council's Audit, Finance, and Analysis Committee
Associate Administrator, International and Interagency Relations
Associate Administrator, Science Mission Directorate
Director, Goddard Space Flight Center
Project Manager, NPOESS Preparatory Project

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    Subcommittee on Investigations and Oversight
    Subcommittee on Space and Aeronautics

Major Contributors to the Report:

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JUNE 2, 2011

REPORT No. IG-11-018

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