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GAO

Report to Congressional Committees

May 2010

POLAR-ORBITING ENVIRONMENTAL SATELLITES

Agencies Must Act Quickly to Address Risks That Jeopardize the Continuity of Weather and Climate Data

GAO-10-558

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Highlights

Highlights of GAO-10-558, a report to congressional committees

Why GAO Did This Study

In the 8 years since a contract was awarded, the National Polar-orbiting Operational Environmental Satellite System (NPOESS)—a tri-agency program managed by the National Oceanic and Atmospheric Administration (NOAA), the Department of Defense (DOD), and the National Aeronautics and Space Administration (NASA)—has experienced escalating costs, schedule delays, and ineffective interagency management. The launch date for a demonstration satellite has been delayed by over 5 years and the cost estimate for the program has more than doubled—to about $15 billion. In February 2010, a Presidential task force decided to disband NPOESS and, instead, have the agencies undertake separate acquisitions.

GAO was asked to (1) assess efforts to establish separate satellite programs; (2) evaluate the status and risks of the NPOESS components still under development; and (3) evaluate the implications of using the demonstration satellite's data operationally. To do so, GAO analyzed program management and cost data, attended program reviews, and interviewed agency officials.

What GAO Recommends

GAO is making recommendations to NOAA and DOD to address key risks in transitioning to their respective new programs. Both agencies agreed with GAO's recommendations and identified plans for addressing them.

View GAO-10-558 or key components.
For more information, contact David A. Powner at (202) 512-9286 or pownerd@gao.gov.

What GAO Found

NOAA and DOD have begun planning to transition the NPOESS program to separate acquisitions, but neither has finalized its plans. NOAA has developed preliminary plans for its new program—called the Joint Polar Satellite Program—to meet the requirements of the afternoon NPOESS orbit. DOD expects to make decisions on the spacecraft and sensors by June and October 2010, respectively. Because neither agency has completed its plans, the impact of the decision to disband the program on expected costs, schedules, and promised capabilities has not been fully determined. Moving forward, the agencies face key risks in transitioning from NPOESS to their separate programs. These risks include the loss of key staff and capabilities, delays in negotiating contract changes and establishing new program offices, the loss of support for the other agency's requirements, and insufficient oversight of new program management. Until these risks are effectively mitigated, it is likely that the satellite programs' costs will continue to grow and launch dates will continue to be delayed, which could lead to gaps in the continuity of critical satellite data.

While NOAA and DOD are establishing plans for their separate acquisitions, the development of key components of the NPOESS program is continuing. In recent months, a critical imaging sensor has been completed and integrated onto the spacecraft of a demonstration satellite, called the NPOESS Preparatory Project (NPP). In addition, the program continues to work on components of the first and second NPOESS satellites, which are to be transferred to NOAA and DOD to become part of their respective follow-on programs. However, the expected launch date of the NPP satellite has been delayed by 9 months due to technical issues in the development of a key sensor. Further, the program is slowing down and may need to stop work on key components because of potential contract liabilities and funding constraints, but has not developed a prioritized list on what to stop first. This may further delay NPP and the components of the first NOAA and DOD satellites under their new programs.

Because the NPP demonstration satellite was designed as a risk-reduction mission, not as an operational asset, it has several limitations. These limitations include fewer ground-based data processing systems, fewer security controls, and a shorter satellite lifespan than exist for current or planned operational satellites. These design limitations mean that, in some cases, NPP's data will not be as timely, useful, and secure as other polar satellites and that there is a risk of a gap in the nation's climate and weather services should NPP fail before the next satellite is launched. Agency officials acknowledge these limitations and are assessing options to make NPP data more timely and secure.

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Abbreviations

CrIS	Cross-track Infrared Sounder
DMSP	Defense Meteorological Satellite Program
DOD	Department of Defense
JPSS	Joint Polar Satellite System
MetOp	Meteorological Operational (satellite)
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NPOESS	National Polar-orbiting Operational Environmental Satellite System
NPP	NPOESS Preparatory Project
OMPS	Ozone Mapping and Profiler Suite
OSTP	Office of Science and Technology Policy
POES	Polar-orbiting Operational Environmental Satellites
VIIRS	Visible/Infrared Imager/Radiometer Suite

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United States Government Accountability Office
Washington, DC 20548

May 27, 2010

The Honorable Bart Gordon
Chairman
The Honorable Ralph Hall
Ranking Member
Committee on Science and Technology
House of Representatives

The Honorable Brad Miller
Chairman
The Honorable Paul Broun, Jr.
Ranking Member
Subcommittee on Investigations and Oversight
Committee on Science and Technology
House of Representatives

The National Polar-orbiting Operational Environmental Satellite System (NPOESS) program was planned to be a state-of-the-art, environment-monitoring satellite system that would replace two existing polar-orbiting environmental satellite systems. Managed jointly by the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), the Department of Defense (DOD)/U.S. Air Force, and the National Aeronautics and Space Administration (NASA), the program was considered critical to the nation's ability to maintain the continuity of data required for weather forecasting (including severe weather events such as hurricanes) and global climate monitoring through the year 2026.

However, in the 8 years since the NPOESS contract was awarded, the cost estimate has more than doubled—to about $15 billion, launch dates have been delayed by over 5 years, significant functionality has been removed from the program, and the program's tri-agency management structure has been ineffective. Importantly, delays in launching the satellites put the program's mission at risk. To address these challenges, a task force led by the White House's Office of Science and Technology Policy (OSTP) reviewed the management and governance of the NPOESS program. In February 2010, the OSTP Director announced his decision to disband the NPOESS acquisition and, instead, to have NOAA and DOD undertake separate acquisitions, with NOAA responsible for satellites in the afternoon orbit and DOD responsible for satellites in the early-morning orbit. While NOAA and DOD begin the transition to separate acquisitions, the development of key components of the NPOESS program is

continuing—including the development of sensors and ground systems supporting a demonstration satellite called the NPOESS Preparatory Project (NPP).

This report responds to your request that we (1) assess efforts to plan for separate satellite acquisitions, (2) evaluate the status and risks of the key NPOESS components still under development, and (3) evaluate the implications of using the demonstration satellite's data operationally. To assess efforts to plan for separate satellite acquisitions, we reviewed the task force's decision to disband the NPOESS program and NOAA's preliminary plans for a replacement satellite program, and we interviewed OSTP, NOAA, and DOD officials. To evaluate the status and risks of key program components, we reviewed program documentation including status briefings, monthly program management documents, and cost reports. To evaluate plans for and implications of using the demonstration satellite's data operationally, we compared the agencies' plans for using NPP data to the plans for using NPOESS data and interviewed relevant NOAA, NASA, and DOD officials. In addition, this report builds on work we have done on environmental satellites over the last several years.[1]

[1]GAO, *Polar-Orbiting Environmental Satellites: With Costs Increasing and Data Continuity at Risk, Improvements Needed in Tri-agency Decision Making*, GAO-09-772T (Washington, D.C.: June 17, 2009); *Polar-orbiting Environmental Satellites: With Costs Increasing and Data Continuity at Risk, Improvements Needed in Tri-agency Decision Making*, GAO-09-564 (Washington, D.C.: June 17, 2009); *Environmental Satellites: Polar-orbiting Satellite Acquisition Faces Delays; Decisions Needed on Whether and How to Ensure Climate Data Continuity*, GAO-08-899T (Washington, D.C.: June 19, 2008); *Environmental Satellites: Polar-orbiting Satellite Acquisition Faces Delays; Decisions Needed on Whether and How to Ensure Climate Data Continuity*, GAO-08-518 (Washington, D.C.: May 16, 2008); *Environmental Satellite Acquisitions: Progress and Challenges*, GAO-07-1099T (Washington, D.C.: July 11, 2007); *Polar-orbiting Operational Environmental Satellites: Restructuring Is Under Way, but Challenges and Risks Remain*, GAO-07-910T (Washington, D.C.: June 7, 2007); *Polar-orbiting Operational Environmental Satellites: Restructuring Is Under Way, but Technical Challenges and Risks Remain*, GAO-07-498 (Washington, D.C.: Apr. 27, 2007); *Polar-orbiting Operational Environmental Satellites: Cost Increases Trigger Review and Place Program's Direction on Hold*, GAO-06-573T (Washington, D.C.: Mar. 30, 2006); *Polar-orbiting Operational Environmental Satellites: Technical Problems, Cost Increases, and Schedule Delays Trigger Need for Difficult Trade-off Decisions*, GAO-06-249T (Washington, D.C.: Nov. 16, 2005); *Polar-orbiting Environmental Satellites: Information on Program Cost and Schedule Changes*, GAO-04-1054 (Washington, D.C.: Sept. 30, 2004); *Polar-orbiting Environmental Satellites: Project Risks Could Affect Weather Data Needed by Civilian and Military Users*, GAO-03-987T (Washington, D.C.: July 15, 2003); and *Polar-orbiting Environmental Satellites: Status, Plans, and Future Data Management Challenges*, GAO-02-684T (Washington, D.C.: July 24, 2002).

We conducted this performance audit from August 2009 to May 2010 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. Additional details on our objectives, scope, and methodology are provided in appendix I.

Background

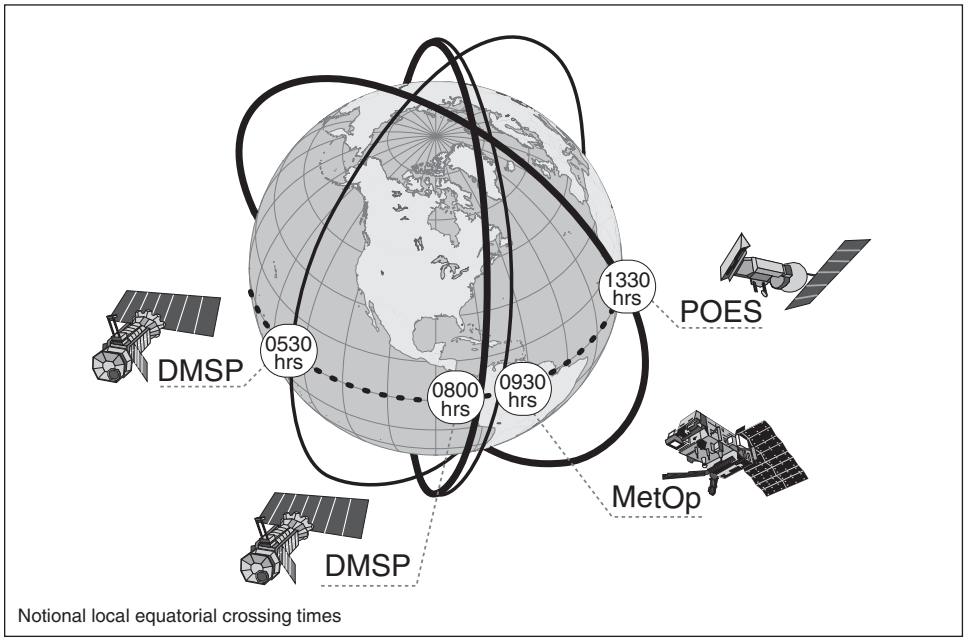
Since the 1960s, the United States has operated two separate operational polar-orbiting meteorological satellite systems: the Polar-orbiting Operational Environmental Satellite (POES) series, which is managed by NOAA, and the Defense Meteorological Satellite Program (DMSP), which is managed by the Air Force.[2] These satellites obtain environmental data that are processed to provide graphical weather images and specialized weather products. These satellite data are also the predominant input to numerical weather prediction models, which are a primary tool for forecasting weather days in advance—including forecasting the path and intensity of hurricanes. The weather products and models are used to predict the potential impact of severe weather so that communities and emergency managers can help prevent and mitigate its effects. Polar satellites also provide data used to monitor environmental phenomena, such as ozone depletion and drought conditions, as well as data sets that are used by researchers for a variety of studies such as climate monitoring.

Unlike geostationary satellites, which maintain a fixed position relative to the earth, polar-orbiting satellites constantly circle the earth in an almost north-south orbit, providing global coverage of conditions that affect the weather and climate. Each satellite makes about 14 orbits a day. As the earth rotates beneath it, each satellite views the entire earth's surface twice a day. Currently, there is one operational POES satellite and two operational DMSP satellites that are positioned so that they cross the equator in the early morning, midmorning, and early afternoon. In addition, the government is also relying on a European satellite, called the

[2]NOAA provides command and control for both the POES and DMSP satellites after they are in orbit.

Meteorological Operational (MetOp) satellite.[3] Together, they ensure that, for any region of the earth, the data provided to users are generally no more than 6 hours old. Besides the four operational satellites, six older satellites are in orbit that still collect some data and are available to provide limited backup to the operational satellites should they degrade or fail. The last POES satellite was launched in February 2009 and declared operational in early June 2009. The Air Force plans to launch its two remaining DMSP satellites as needed. Figure 1 illustrates the current operational polar satellite configuration.

Figure 1: Configuration of Operational Polar Satellites



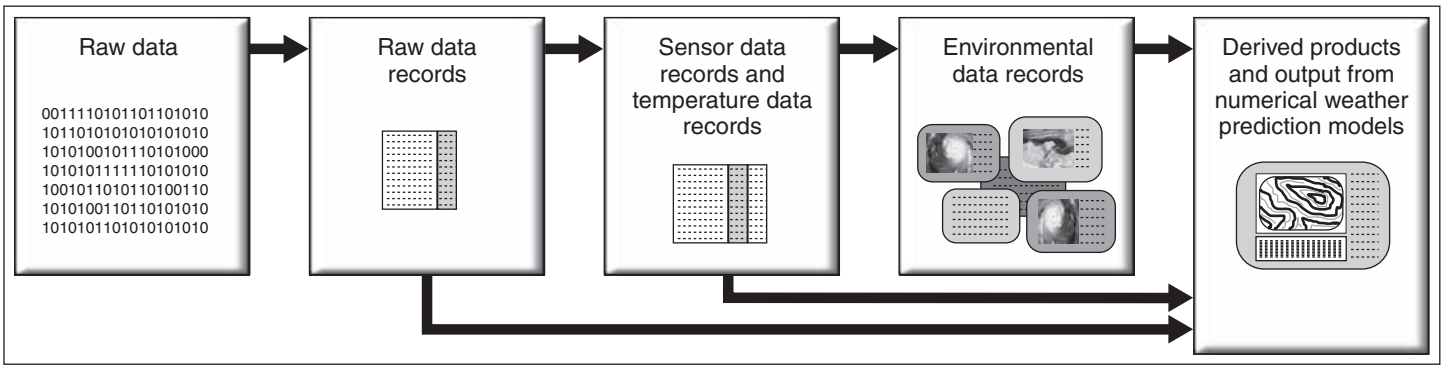
Sources: GAO, based on NPOESS Integrated Program Office and DOD data, MapArt (globe).

[3]The European Organisation for the Exploitation of Meteorological Satellite's MetOp program is a series of three polar-orbiting satellites dedicated to operational meteorology. MetOp satellites are planned to be launched sequentially over 14 years. The first of these satellites was launched in 2006 and is currently operational.

Polar Satellite Data and Products

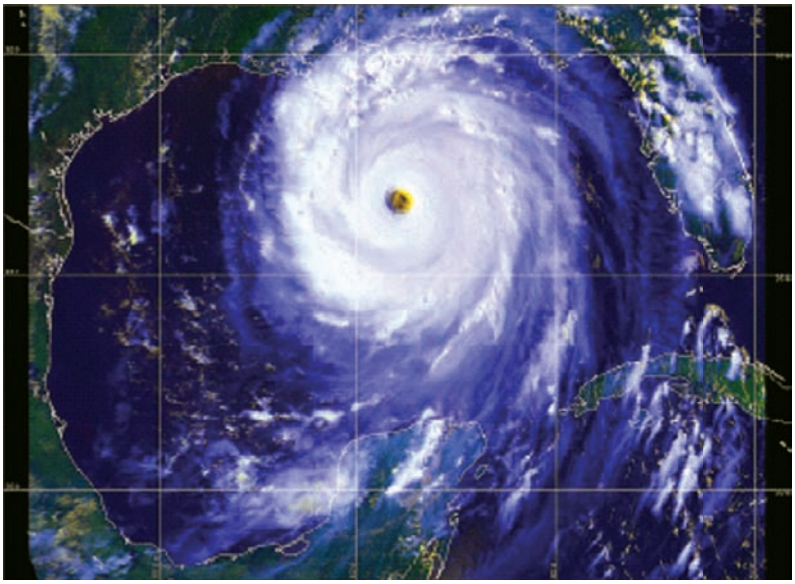
Polar satellites gather a broad range of data that are transformed into a variety of products. Satellite sensors observe different bands of radiation wavelengths, called channels, which are used for remotely determining information about the earth's atmosphere, land surface, oceans, and the space environment. When first received, satellite data are considered raw data. To make them usable, processing centers format the data so that they are time-sequenced and include earth location and calibration information. After formatting, these data are called raw data records. The centers further process these raw data records into channel-specific data sets, called sensor data records and temperature data records. These data records are then used to derive weather and climate products called environmental data records. These environmental data records include a wide range of atmospheric products detailing cloud coverage, temperature, humidity, and ozone distribution; land surface products showing snow cover, vegetation, and land use; ocean products depicting sea surface temperatures, sea ice, and wave height; and characterizations of the space environment. Combinations of these data records (raw, sensor, temperature, and environmental data records) are also used to derive more sophisticated products, including outputs from numerical weather models and assessments of climate trends. Figure 2 is a simplified depiction of the various stages of satellite data processing, and figure 3 depicts examples of two different weather products.

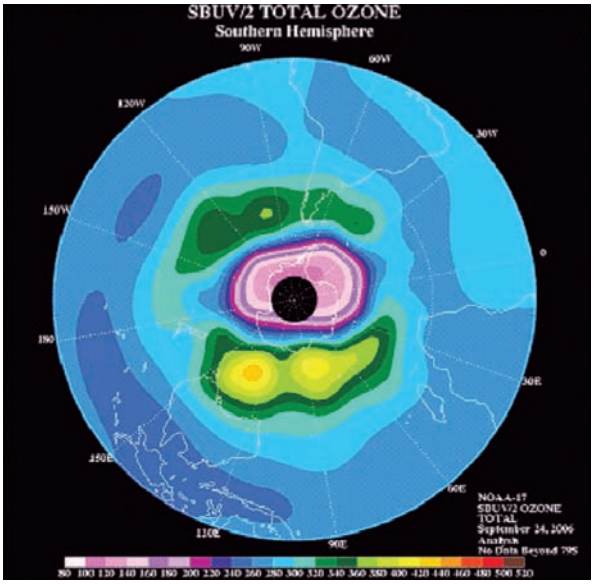
Figure 2: Stages of Satellite Data Processing



Source: GAO analysis of NOAA information.

Figure 3: Examples of Weather Products





Source: NOAA's National Environmental Satellite Data and Information Service.

Note: The figure on the left is a POES Image of Hurricane Katrina in 2005; the figure on the right is an analysis of ozone concentration produced from POES satellite data.

NPOESS Overview: Inception, Management Structure, and Acquisition Strategy

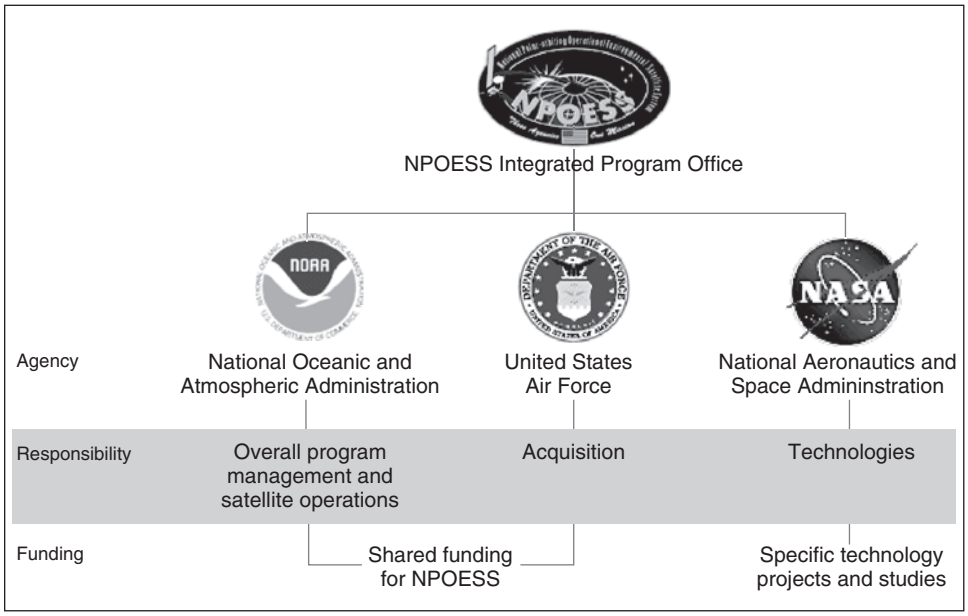
With the expectation that combining the POES and DMSP programs would reduce duplication and result in sizable cost savings, a May 1994 Presidential Decision Directive required NOAA and DOD to converge the two satellite programs into a single satellite program capable of satisfying both civilian and military requirements.[4] The converged program, NPOESS, was considered critical to the nation's ability to maintain the continuity of data required for weather forecasting and global climate monitoring.

To manage this program, DOD, NOAA, and NASA formed a tri-agency Integrated Program Office. Within the program office, each agency has the lead on certain activities: NOAA has overall program management responsibility for the converged system and for satellite operations; the Air Force has the lead on the acquisition; and NASA has primary responsibility for facilitating the development and incorporation of new technologies

[4]Presidential Decision Directive NSTC-2, May 5, 1994.

into the converged system. NOAA and DOD share the cost of funding NPOESS, while NASA funds specific technology projects and studies. In addition, an Executive Committee—made up of the administrators of NOAA and NASA and the Under Secretary of Defense for Acquisition, Technology, and Logistics—is responsible for providing policy guidance, ensuring agency support and funding, and exercising oversight authority. Figure 4 depicts the organizations that make up the NPOESS program office and lists their responsibilities.

Figure 4: NPOESS Program Roles and Responsibilities



Source: GAO analysis of NPOESS program office data.

NPOESS is a major system acquisition that was originally estimated to cost about $6.5 billion over the 24-year life of the program from its inception in 1995 through 2018. The program includes satellite development, satellite launch and operation, and ground-based satellite data processing. When the NPOESS engineering, manufacturing, and development contract was awarded in August 2002, the cost estimate was adjusted to $7 billion.

Acquisition plans called for the procurement and launch of six satellites over the life of the program, as well as the integration of 13 instruments—consisting of 10 environmental sensors and 3 subsystems. Together, the sensors were to receive and transmit data on atmospheric, cloud cover,

environmental, climatic, oceanographic, and solar-geophysical observations. The subsystems were to support non-environmental search and rescue efforts, system survivability, and environmental data collection activities.

In addition, a demonstration satellite, called the NPOESS Preparatory Project (NPP), was planned to be launched several years before the first NPOESS satellite in order to reduce the risk associated with launching new sensor technologies and ensure continuity of climate data with NASA's Earth Observing System satellites. NPP is a joint mission between the NPOESS program office and NASA. NPP was to host four NPOESS sensors and provide the program office and the processing centers an early opportunity to work with the sensors, ground control, and data processing systems.[5]

When the NPOESS development contract was awarded in 2002, the schedule for launching the satellites was driven by a requirement that the NPOESS satellites be available to back up the final POES and DMSP satellites should anything go wrong during the planned launches of these satellites.[6] Early program milestones included (1) launching NPP by May 2006, (2) having the first NPOESS satellite available to back up the final POES satellite launch then planned for March 2008, and (3) having the second NPOESS satellite available to back up the final DMSP satellite launch then planned for October 2009. If the NPOESS satellites were not needed to back up the final predecessor satellites, their anticipated launch dates would have been April 2009 and June 2011, respectively.

[5]The four original sensors on NPP were the Visible/Infrared Imager/Radiometer Suite, the Cross-track Infrared Sounder, the Advanced Technology Microwave Sounder, and the Ozone Mapping and Profiler Suite. In January 2008, the NPOESS Executive Committee agreed to add the Clouds and the Earth's Radiant Energy System sensor to NPP.

[6]The contract was awarded to TRW in August 2002. Shortly after the contract was awarded, Northrop Grumman Space Technology purchased TRW and became the prime contractor on the NPOESS project.

Cost Increases, Schedule Delays, and Technical Problems Led to a Decision to Restructure NPOESS in 2006

Over several years, we reported that NPOESS had experienced continued cost increases, schedule delays, and serious technical problems.[7] By November 2005, we estimated that the cost of the program had grown from $7 billion to over $10 billion. In addition, the program was experiencing major technical problems with a critical imaging sensor that were expected to delay the launch date of the first satellite by almost 2 years. These issues ultimately required difficult decisions to be made about the program's direction and capabilities.

The Nunn-McCurdy law requires DOD to take specific actions when a major defense acquisition program's cost growth exceeds certain thresholds.[8] Where applicable, the law requires the Secretary of Defense to certify the program to Congress when it is expected to overrun its current baseline by 25 percent or more. In November 2005, NPOESS breached the 25 percent threshold, and DOD was required to certify the program for it to continue. The requirements for certifying a program, as relevant here, involved a determination that (1) the program is essential to national security, (2) there are no alternatives to the program that will provide equal or greater military capability at less cost, (3) the new estimates of the program's cost are reasonable, and (4) the management structure for the program is adequate to manage and control costs. DOD established tri-agency teams—made up of DOD, NOAA, and NASA experts—to work on each of the four elements of the certification process.

In June 2006, DOD (with the agreement of both of its partner agencies) certified a restructured NPOESS program, estimated to cost $12.5 billion through 2024—an increase of $4 billion more than the prior life-cycle cost estimate.[9] This restructuring decision delayed the launch of NPP and the first two satellites (called C1 and C2) by roughly 3 to 5 years—a deviation from the requirement to have NPOESS satellites available to back up the final POES and DMSP satellites should anything go wrong during those launches. The restructured program also reduced the number of satellites

[7]GAO-06-573T, GAO-06-249T, GAO-04-1054, GAO-03-987T, and GAO-02-684T.

[8]10 U.S.C. § 2433 (Supp. V 2005). For the current provisions of Nunn-McCurdy that are reflected herein see 10 U.S.C. §§ 2433 and 2433a (Supp. III 2009).

[9]DOD estimated that the acquisition portion of the certified program would cost $11.5 billion. The acquisition portion includes satellite development, production, and launch, but not operations and support costs after launch. When combined with an estimated $1 billion for operations and support after launch, this brings the program life-cycle cost to $12.5 billion.

to be produced by relying on European satellites for the midmorning orbit and planning to use NPOESS satellites in the early-morning and afternoon orbits. In addition, in order to reduce program complexity, the Nunn-McCurdy certification decision decreased the number of NPOESS instruments from 13 to 9 and reduced the functionality of 4 sensors. Table 1 summarizes the major program changes made by the Nunn-McCurdy certification decision and table 2 describes the sensors that were planned for NPP and NPOESS after the Nunn-McCurdy certification.

Table 1: Major Changes to the NPOESS Program by the Nunn-McCurdy Certification Decision

Key area	Program before the Nunn-McCurdy decision	Program after the Nunn-McCurdy decision (as of June 2006)
Life-cycle range	1995 through 2020	1995 through 2026
Estimated life-cycle cost	$8.4 billion	$12.5 billion[a]
Launch schedule	NPP by October 2006	NPP by January 2010
	First NPOESS (C1) by November 2009	C1 by January 2013
	Second NPOESS (C2) by June 2011	C2 by January 2016
Management structure	System Program Director reports to a tri-agency steering committee and the tri-agency Executive Committee	System Program Director is responsible for day-to-day program management and reports to the Program Executive Officer
	Independent program reviews noted insufficient system engineering and cost analysis staff	Program Executive Officer oversees program and reports to the tri-agency Executive Committee
Number of satellites	6 (in addition to NPP)	4 (in addition to NPP)
Number of orbits	3 (early morning, midmorning, and afternoon)	2 (early morning and afternoon; will rely on European satellites for midmorning orbit data)
Number and complement of instruments	13 instruments (10 sensors and 3 subsystems)	9 instruments (7 sensors and 2 subsystems); 4 of the sensors are to provide fewer capabilities
Number of environmental data records	55	39 (6 are to be degraded products)

Source: GAO analysis of NPOESS program office data.

[a]Although the program's life cycle was through 2026, the cost estimate was only through 2024.

Table 2: Description of Expected NPP and NPOESS Sensors, as of May 2008

Sensor	Description
Advanced Technology Microwave Sounder	Measures microwave energy released and scattered by the atmosphere and is to be used with infrared sounding data from the Cross-track Infrared Sounder to produce daily global atmospheric temperature, humidity, and pressure profiles.
Microwave Imager/Sounder	Collects microwave images and data needed to determine sea ice characterization and measure rain rate, ocean surface wind speed and direction, amount of water in the clouds, and soil moisture, as well as temperature and humidity at different atmospheric levels.
Cross-track Infrared Sounder (CrIS)	Collects measurements of the earth's radiation to determine the vertical distribution of temperature, moisture, and pressure in the atmosphere.
Clouds and the Earth's Radiant Energy System sensor	Measures solar short-wave radiation and long-wave radiation released by the earth back into space on a worldwide scale to enhance long-term climate studies.
Ozone Mapping and Profiler Suite (OMPS)	Collects data needed to measure the amount and distribution of ozone in the earth's atmosphere. Consists of two components (limb and nadir) that can be provided separately.
Space Environment Monitor	Collects data to identify, reduce, and predict the effects of space weather on technological systems, including satellites and radio links.
Total and Spectral Solar Irradiance Sensor	Monitors and captures total and spectral solar irradiance data.
Visible/Infrared Imager/Radiometer Suite (VIIRS)	Collects images and radiometric data used to provide information on the earth's clouds, atmosphere, ocean, and land surfaces.

Source: GAO analysis of NPOESS program office data.

The changes in NPOESS sensors affected the number and quality of the resulting weather and environmental products. In selecting sensors for the restructured program during the Nunn-McCurdy process, decision makers placed the highest priority on continuing current operational weather capabilities and a lower priority on obtaining selected environmental and climate measuring capabilities. As a result, the revised NPOESS system had significantly less capability for providing global climate, ocean, and space environment measures than was originally planned. Specifically, the number of environmental data records was decreased from 55 to 39, of which 6 were of a reduced quality. The 39 data records that remain include cloud base height, land surface temperature, precipitation type and rate, and sea surface winds. The 16 data records that were removed include cloud particle size and distribution, sea surface height, net solar radiation at the top of the atmosphere, and products to depict the electric fields in the space environment. The six data records that are of a reduced quality include ozone profile, soil moisture, and multiple products depicting energy in the space environment.

After the 2006 Nunn-McCurdy decision, the NPOESS Executive Committee decided to add selected sensors back to individual satellites in order to

address concerns from the climate community about the loss of key climate data. In January 2008, the Committee approved plans to include the Clouds and the Earth's Radiant Energy System sensor on the NPP satellite. In addition, in May 2008, the Committee approved plans to include a Total and Spectral Solar Irradiance Sensor on the C1 satellite. Table 3 shows which sensors were planned for NPP and the four satellites of the NPOESS program, called C1, C2, C3, and C4, as of May 2008. Program officials acknowledged that these configurations could change if other parties decide to develop the sensors that were canceled.

Table 3: Configuration of Sensors Planned for NPP and NPOESS Satellites, as of May 2008

Sensor	NPP	NPOESS C1 (PM)	NPOESS C2 (AM)	NPOESS C3 (PM)	NPOESS C4 (AM)
Advanced Technology Microwave Sounder	X	X	O	X	O
Microwave Imager/Sounder	—	—	X	X	X
Cross-track Infrared Sounder (CrIS)	X	X	O	X	O
Clouds and the Earth's Radiant Energy System sensor	X	X	—	—	—
Ozone Mapping and Profiler Suite (OMPS) Nadir / Limb components[a]	X/X	X/O	—	X/O	—
Space Environment Monitor	—	X	—	X	—
Total and Spectral Solar Irradiance Sensor	—	X	O	—	O
Visible/Infrared Imager/Radiometer Suite (VIIRS)	X	X	X	X	X

Key:

X = Sensor is currently planned for this satellite

O = Canceled during the Nunn-McCurdy certification, but could be restored to this satellite

— = Not applicable—sensor was never planned for this satellite

Source: GAO analysis of NPOESS program office data.

[a]The OMPS sensor consists of two components, called the nadir and limb. During the 2006 restructuring, a decision was made to remove the limb component from both C1 and C3 satellites.

NPOESS Continued to Experience Management Challenges, Cost Overruns, and Schedule Delays after the 2006 Restructuring

After the program was restructured, the NPOESS program continued to experience cost growth, schedule delays, and management challenges. In April 2007, we reported that DOD's plans to reassign the Program Executive Officer would unnecessarily increase risks to an already risky program.[10] We also reported that, while the program office had made progress in restructuring NPOESS after the June 2006 Nunn-McCurdy certification decision, important tasks leading up to finalizing contract

[10]GAO-07-498.

changes remained to be completed. Specifically, executive approval of key acquisition documents was about 6 months late at that time—due in part to the complexity of navigating three agencies' approval processes. To address these issues, we recommended that DOD delay the reassignment of the Program Executive Officer until all sensors were delivered to NPP, and that the appropriate agency executives finalize key acquisition documents by the end of April 2007.

In May 2008, we reported that DOD had reassigned the Program Executive Officer and that key acquisition documents were more than a year late. We reiterated our prior recommendation that the agencies immediately complete the acquisition documents.[11] In addition, we reported that poor workmanship and testing delays caused an 8-month slip to the expected delivery date of the Visible/Infrared Imager/Radiometer Suite (VIIRS) sensor. This late delivery caused a corresponding delay in the expected launch date of the NPP demonstration satellite, moving it to June 2010.

In June 2008, we also reported that the program's life-cycle costs, estimated at $12.5 billion, were expected to rise by approximately $1 billion because of problems experienced in the development of the VIIRS and Cross-track Infrared Sounder (CrIS) sensors, the need to revise outdated operations and support cost estimates, and the need to modify information security requirements on ground systems.[12] Program officials subsequently modified their life-cycle cost estimate in December 2008 to $13.95 billion, which included about $1.15 billion for revised pre- and post-launch operations and support costs and about $300 million to address development issues. The revised cost estimate did not include funds to modify information security requirements.

In June 2009, we added to our previous concerns about the tri-agency oversight of the NPOESS program.[13] Specifically, we reported that the Executive Committee was ineffective because the DOD acquisition executive did not attend committee meetings; the committee did not track its action items to closure; and many of the committee's decisions did not achieve desired outcomes. We also reported that the life-cycle cost estimate of $13.95 billion was expected to rise by another $1 billion, and the schedules for NPP

[11] GAO-08-518.

[12] GAO-08-899T.

[13] GAO-09-564.

and the first two NPOESS satellites were expected to be delayed by 7, 14, and 5 months, respectively. (See table 4 for the history of cost and schedule estimates for the program.) We recommended that the DOD Executive Committee member attend and participate in Executive Committee meetings, and that the Executive Committee better track and manage risk and action items. Additionally, we recommended that the program develop plans to mitigate the risk of gaps in satellite continuity and establish a realistic time frame for revising the program's cost and schedule baselines.

Table 4: Changes in NPOESS Life-Cycle Cost Estimates and Estimated Satellite Launch

(Dollars in billions)

As of	Life-cycle cost estimate	NPP launch	C1 launch	C2 launch
August 2002	$7.0	May 2006	April 2009	June 2011
July 2003	7.0	October 2006	November 2009	June 2011
September 2004	8.1	October 2006	November 2009	June 2011
August 2005	8.1	April 2008	December 2010	December 2011
June 2006	12.5	January 2010	January 2013	January 2016
December 2008	13.95	January 2010	January 2013	January 2016
June 2009	14.95[a]	January 2011	March 2014	May 2016

Source: GAO analysis of program office and contractor data.

[a]This is a GAO estimate based on our analysis of contractor data.

To address risks and challenges, the NPOESS Executive Committee sponsored a series of reviews of the program. Two of the reviews, conducted in 2007 and 2008, examined the feasibility of alternative management strategies. Both of these reviews recommended against changing the prime contractor and made recommendations to improve other aspects of program management—including the government's executive and program management and the contractor's management. In the fall of 2008, an independent review team assessed the program and delivered its final report in June 2009. Among other things, the independent review team found that the program had a low probability of success, the continuity of data was at risk, and the priorities of DOD and NOAA were not aligned. The team recommended using NPP data operationally to mitigate potential gaps in coverage, co-locating the program at an acquisition center, and involving the White House to resolve priority differences. In March 2009, in response to a draft of the review team's report, the NPOESS Executive Committee decided to use NPP data operationally.

Executive Office Review Led to a Decision to Disband the NPOESS Program

In August 2009, the Executive Office of the President formed a task force, led by the Office of Science and Technology Policy (OSTP), to investigate the management and acquisition options that would improve the NPOESS program.[14] Specifically, the task force sought to identify a governance structure that would address the problems in schedule and budget, and the risk of a loss of satellite data due to delays in launching the satellites. In performing its review, the task force worked with NOAA, DOD, and NASA representatives and attended Executive Committee meetings.

In February 2010, the Director of OSTP announced that NOAA and DOD will no longer jointly procure the NPOESS satellite system; instead, each agency would plan and acquire its own satellite system. Specifically, NOAA is to be responsible for the afternoon orbit and the observations planned for the first and third NPOESS satellites. DOD is to be responsible for the morning orbit and the observations planned for the second and fourth NPOESS satellites. The partnership with the European satellite agencies for the midmorning orbit is to continue as planned. In addition, the task force explained that partnerships between DOD, NOAA, and NASA should continue and encouraged the agencies to continue joint efforts in the areas that have been successful in the past, such as the command and control of the satellites. Moving forward, while NOAA and DOD develop plans for separate acquisitions, the development of key components of the NPOESS program is continuing. Specifically, the program is continuing to develop the instruments and ground systems supporting NPP and selected components of the first two NPOESS satellites, which will likely be needed by the NOAA and DOD follow-on programs.

[14]The NPOESS task force consisted of participants from OSTP, the Office of Management and Budget, and the National Security Council.

Agencies Have Begun Planning for Separate Acquisitions, but the Impact of This New Approach Is Not Fully Known and Key Transition Risks Exist

NOAA and DOD have begun planning to transition the NPOESS program to separate acquisitions, but the agencies are at different stages in planning and neither has finalized its plans. NOAA has developed preliminary plans for a new program to fulfill the requirements of the afternoon NPOESS orbit. DOD has just begun planning how it will meet the requirements of the morning orbit, and expects to have initial decisions on how it will proceed in acquiring the spacecraft and sensors by June 2010 and October 2010, respectively. Because neither agency has completed its plans, the impact of the decision to disband the program on expected costs, schedules, and promised capabilities has not yet been fully determined. However, it is likely that the decision will further delay the first satellite's launch schedule, add to the overall cost, and remove selected capabilities. Moving forward, the agencies face key risks in transitioning from NPOESS to two separate programs. These risks include the loss of key staff and capabilities, added delays in negotiating contract changes and establishing new program offices, the loss of support for the other agency's requirements, and insufficient oversight of new program management. Until these risks are effectively mitigated, it is likely that the satellite programs' costs will continue to grow and launch dates will continue to be delayed. Further delays are likely to jeopardize the availability and continuity of weather and climate data.

NOAA and DOD Have Begun Planning for Their Separate Acquisitions, but the Impact on Cost, Schedule, and Capabilities Is Not Fully Known

NOAA and DOD have begun planning to transition the NPOESS program to separate acquisitions, but the two agencies are at different stages in planning. NOAA has developed preliminary plans for its new satellite acquisition program—called the Joint Polar Satellite System (JPSS). Specifically, NOAA developed plans for two satellites to fly in the afternoon orbit. NOAA plans to have the first JPSS satellite, formerly NPOESS C1, available for launch in 2015, and the second JPSS satellite, formerly NPOESS C3, available for launch in 2018.[15] NOAA will also provide the ground systems for both the JPSS and DOD programs. Current plans estimate that the life-cycle cost of the JPSS program will be approximately $11.9 billion, which includes $2.9 billion in NOAA funds spent on NPOESS through fiscal year 2010.[16]

[15]NOAA officials noted that these dates could change as transition plans are developed.

[16]This estimate does not include approximately $2.9 billion that DOD has spent through fiscal year 2010 on NPOESS.

NOAA is also considering technical changes to the program that involve the size of the spacecraft and the sensors to be included on each of the satellites. Specifically, NOAA is considering using a smaller spacecraft than the one planned for NPOESS. NOAA is also considering removing sensors that were planned for the NPOESS C1 and C3 satellites and obtaining those data from other sources, including international satellites.[17] Table 5 includes preliminary plans for which sensors will be accommodated on the JPSS satellites.

Table 5: Configuration of Sensors Planned for NPP and JPSS Satellites, as of March 2010

Sensor	NPP	JPSS-1 (C1 equivalent)	JPSS-2 (C3 equivalent)
Advanced Technology Microwave Sounder	X	X	X
Microwave Imager/Sounder	—	—	0
Cross-track Infrared Sounder (CrIS)	X	X	X
Clouds and the Earth's Radiant Energy System/Earth Radiation Budget Sensor[a]	X	X	X
Ozone Mapping and Profiler Suite (OMPS) Nadir/Limb components[b]	X/X	X/?	X/X
Space Environment Monitor	—	0	0
Total and Spectral Solar Irradiance Sensor[c]	—	?	?
Visible/Infrared Imager/Radiometer Suite (VIIRS)	X	X	X

Key:

X = Sensor is currently planned for this satellite

? = A decision has not been made as to whether it will be on this satellite

0 = Sensor was planned for the NPOESS satellite, but NOAA currently does not plan to include it on the JPSS satellite

— = Not applicable—sensor was never planned for this satellite

Source: GAO analysis of NPOESS program office data.

[a]The Clouds and the Earth's Radiant Energy System sensor is to be included on NPP and JPSS-1. The Earth Radiation Budget Sensor—a follow-on sensor—is to be included on JPSS-2.

[b]The OMPS sensor consists of two components, called the nadir and limb. During the 2006 restructuring, a decision was made to remove the limb component from both C1 and C3 satellites. NOAA plans for OMPS limb to be included on JPSS-2, but may move it to JPSS-1 if the schedule allows.

[c]Although NOAA plans to develop the Total and Spectral Solar Irradiance Sensor, it has not determined whether the sensor will be included on JPSS-1, JPSS-2, or a different accommodation.

[17]NOAA officials are currently revisiting plans for the Space Environment Monitor and the Microwave Imager/Sounder. Although they plan to launch the Total and Spectral Solar Irradiance Suite, NOAA officials have not yet made a decision on which satellite will host the sensor.

The management of the JPSS satellites will also change from that of the NPOESS satellites. NOAA plans to transfer the management of acquisition from the NPOESS program office to NASA's Goddard Space Flight Center, so that it can be co-located at a space system acquisition center as advocated by the NPOESS independent review team. According to NOAA officials, the agency will provide direction, requirements, and budget to NASA. NOAA will also provide staff, including a program director and program scientist. A NASA employee will function as program manager. In addition, NOAA has developed a team to lead the transition from NPOESS to JPSS and has included representatives from NOAA, NASA, and DOD. Because this team has just been formed, they have not yet fully developed plans to guide the transition. NOAA officials plan to begin transitioning in July, and complete the transition plan—including cost and schedule estimates—by the end of September.

DOD is at an earlier stage in its planning process, in part because it has more time before the first satellite in the morning orbit is needed. DOD officials are currently reviewing requirements for the morning orbit and plan to define how to proceed by the end of June 2010. After this review is completed, DOD plans to analyze alternatives for meeting the requirements and to develop a plan for the chosen alternative. DOD anticipates making a decision on whether to use the NPOESS spacecraft by June 2010 and to make a decision on which sensors it will include—including the Space Environment Monitor and the Microwave Imager/Sounder—by October 2010. DOD acquisition officials expect to begin the program in fiscal year 2013.

Table 6 compares key attributes of the NPOESS program when it was restructured in 2006 to the NPOESS program at the time of the task force decision in 2010 and to preliminary plans for the separate NOAA and DOD acquisitions.

Table 6: Comparison of NPOESS to the New NOAA and DOD Acquisitions

Key area	NPOESS program after the Nunn-McCurdy decision (as of June 2006)	NPOESS program (as of February 2010)	NOAA and DOD acquisition plans (as of February 2010)
Life-cycle range	1995-2026	1995-2026	*JPSS*: 1995-2024 *DOD program*: unknown
Estimated life-cycle cost[a]	$12.5 billion	$13.95+ billion[b]	*JPSS*: $11.9 billion (which includes about $2.9 billion in NOAA funds spent through fiscal year 2010 on NPOESS) *DOD program*: unknown; DOD's initial estimates include costs of about $5 billion through fiscal year 2015 (which includes about $2.9 billion in DOD funds spent through fiscal year 2010 on NPOESS)
Launch schedule	NPP by January 2010 C1 by January 2013 C2 by January 2016 C3 by January 2018 C4 by January 2020	NPP no earlier than September 2011 C1 by March 2014[c] C2 by May 2016 C3 by January 2018 C4 by January 2020	NPP no earlier than September 2011 JPSS-1 (C1 equivalent) available in 2015 JPSS-2 (C3 equivalent) available in 2018 *DOD program*: unknown
Number of sensors	NPP: 4 sensors C1: 6 sensors C2: 2 sensors C3: 6 sensors C4: 2 sensors	NPP: 5 sensors C1: 7 sensors[d] C2: 2 sensors C3: 6 sensors C4: 2 sensors	NPP: 5 sensors JPSS-1 and 2: Although NOAA has not determined the exact complement of sensors, it will have at least 5 of the original NPOESS sensors[e] *DOD program*: unknown

Source: GAO analysis of NOAA, DOD, and task force data.

[a]Although the life-cycle ranges for NPOESS are through 2026, the cost estimates for both NPOESS and JPSS are only through 2024.

[b]Although the program baseline is currently $13.95 billion, we estimated in June 2009 that this cost could grow by about $1 billion. In addition, officials from the Executive Office of the President stated that they reviewed life-cycle cost estimates from DOD and the NPOESS program office of $15.1 billion and $16.45 billion, respectively.

[c]Officials from the Executive Office of the President noted that the expected launch date of C1 had slipped to late 2014 by the time of their decision.

[d]In May 2008, the NPOESS Executive Committee approved an additional sensor—the Total and Spectral Solar Irradiance Sensor—for the C1 satellite.

[e]These five sensors are: VIIRS, CrIS, OMPS-nadir, the Advanced Technology Microwave Sounder, and the Clouds and the Earth's Radiant Energy System/Earth Radiation Budget Sensor.

Because neither agency has finalized plans for its acquisition, the full impact of the task force decision on the expected cost, schedule, and capabilities is unknown. However, it appears likely that the combined cost of the separate acquisitions could be higher than the last NPOESS estimate, the schedule for the first satellite's launch will be later than the

last NPOESS estimate, and selected capabilities will be removed from the program.

- Cost: NOAA anticipates that the JPSS program will cost approximately $11.9 billion to complete through 2024.[18] Although this estimated cost is less than the baselined cost of the NPOESS program, DOD will still need to fund and develop satellites to meet the requirements for the early morning orbit. DOD's initial estimates are for its new program to cost almost $5 billion through fiscal year 2015.[19] Thus, it is likely that the cost of the two acquisitions will exceed the baselined life-cycle cost of the NPOESS program.

- Schedule: Neither NOAA nor DOD have finalized plans that show the full impact of the restructuring on the schedule for satellite development. We have previously reported that restructuring a program like NPOESS could take significant time to accomplish, due in part to the time taken revising, renegotiating, or developing important acquisition documents, including contracts and interagency agreements.[20] With important decisions and negotiations still pending, it is likely that the expected launch date of the first JPSS satellite will be delayed.

- Capabilities: Neither agency has made final decisions on the full set of sensors—or which satellites will accommodate them—for their respective satellite programs. Until those decisions are made, it will not be possible to determine the capabilities that these satellites will and will not provide.

  Timely decisions on cost, schedule, and capabilities would allow both acquisitions to move forward and satellite data users to start planning for any data shortfalls they may experience. Until DOD and NOAA finalize their plans, it is not clear whether the new acquisitions will meet the requirements of both civilian and military users.

[18]NOAA officials reported that the JPSS cost estimate is at a higher confidence level than the previous NPOESS life-cycle cost estimates.

[19]This estimate is not a life-cycle cost estimate and could change as DOD completes its requirements review and analysis of alternatives for their new program. DOD has not yet developed a life-cycle cost estimate.

[20]GAO-06-573T.

NOAA and DOD Face Key Transition Risks That Threaten Satellite Continuity

Moving forward, the agencies face key risks in transitioning from NPOESS to their new programs. These risks include the loss of key staff and capabilities, delays resulting from negotiating contract changes and establishing new program offices, the loss of support for both agencies' requirements, and insufficient oversight of new program management.

- *Loss of key staff and capabilities*—The NPOESS program office is composed of NOAA, NASA, Air Force, and contractor staff with knowledge and experience in spacecraft procurement and integration, ground systems, sensors, data products, systems engineering, budgeting, and cost analysis. These individuals have knowledge and experience in the status, risks, and lessons learned from the NPOESS program. This knowledge will be critical to moving the program forward both during and after the transition period. However, program office staff have already begun leaving—or looking for other employment—due to the uncertainties about the future of the program office. Unless NOAA is proactive in retaining these staff, the new program may waste valuable time if staff must relearn program details and may repeat mistakes made and lose lessons learned by prior program staff.

- *Delays in negotiating contract changes and establishing new programs*—We have previously reported that restructuring a program like NPOESS could take significant time to accomplish, due in part to the time taken revising, renegotiating, or developing important acquisition documents, including contracts and interagency agreements.[21] According to NOAA officials, the plan for JPSS may require negotiations with contractors and between contractors and their subcontractors. In addition, both NOAA and DOD will need to establish and fully staff program offices to facilitate and manage the transition and new programs. However, these contract and program changes have not yet occurred and it is not clear when they will occur. These changes could take significant time to complete. Meanwhile, the NPOESS program office continues to support—and fund—development activities that may not be used in the new programs, because neither NOAA nor DOD have made key decisions on the technologies, such as the spacecraft and sensors, that will be included on the new programs. Until decisions are made on how the program is to proceed with contract changes and terminations, the contractors and program office cannot implement the chosen solution and some decisions, such as the ability to hold schedule slips to a minimum, could become much more difficult.

[21]GAO-06-573T.

- *Failure to support the other agency's requirements*—As a joint program, NPOESS was expected to fulfill many military, civilian, and research requirements for environmental data. The task force decision to restructure NPOESS noted that decisions on future satellite programs should ensure the continuity of critical satellite data. However, because the requirements of NOAA and DOD are different, the agencies may develop programs that meet their own needs but not the other's. DOD, NOAA, and NASA will still need to work together to ensure that requirements are known, agreed upon, and managed, and that changes in their respective program's capabilities do not degrade the continuity requirements. For example, NOAA officials reported that they do not plan to include the Microwave Imager/Sounder in their follow-on program and will instead procure data from a different sensor on an international satellite. However, it is not clear that NOAA's plans will meet the needs of all of DOD's users, including the Navy and Army. Similarly, it is not clear that DOD will continue to support the climate community's requirements for highly calibrated and accurate measurements. If the agencies cannot find a way to build a partnership that facilitates both efficient and effective decision-making on data continuity needs, the data continuity needs of both agencies may not be adequately incorporated into the new programs.

- *Insufficient oversight of new program management*—Under its new JPSS program, NOAA plans to transfer parts of the NPOESS program to NASA, but it has not yet defined how it will oversee NASA's efforts. Transferring the program to NASA will not necessarily resolve existing cost, schedule, and subcontractor management issues. We recently reported that the acquisition challenges faced in major NASA acquisitions are similar to the ones faced by DOD acquisitions, including NPOESS.[22] Specifically, we reported that NASA has consistently underestimated time and cost and has not adequately managed risk factors such as contractor performance. Because of these issues, we listed NASA's acquisition management as a high-risk area in 1990, and it remains a high-risk area today.[23] In addition, our work on the GOES I-M satellite series found that NOAA did not have the ability to make quick decisions on problems because portions of the procurement were managed by NASA.[24]

[22]GAO, *NASA: Projects Need More Disciplined Oversight and Management to Address Key Challenges*, GAO-09-436T (Washington, D.C.: Mar. 5, 2009).

[23]GAO, *High-Risk Series: An Update*, GAO-09-271 (Washington, D.C.: January 2009).

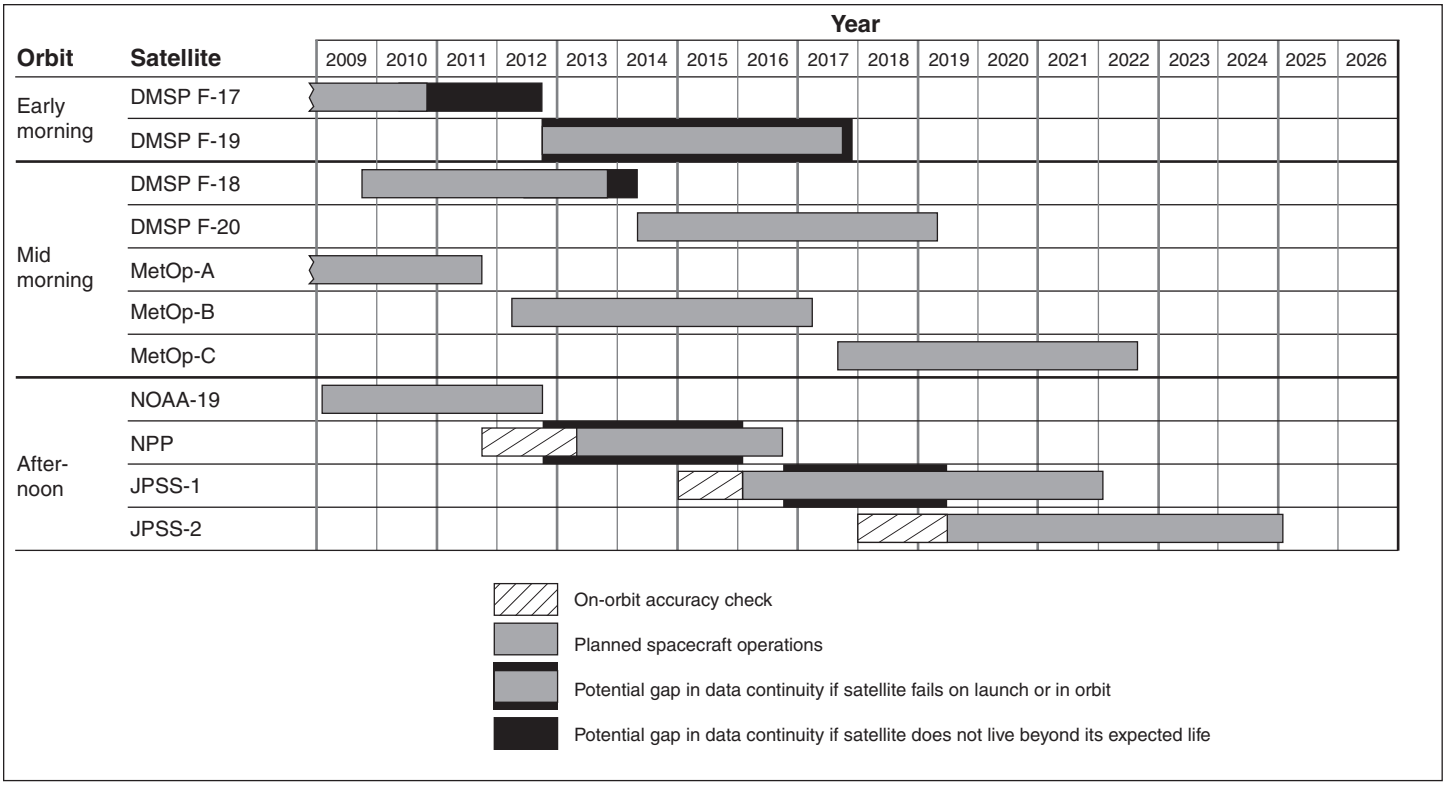
[24]GAO, *Geostationary Operational Environmental Satellites: Steps Remain in Incorporating Lessons Learned from Other Satellite Programs*, GAO-06-993 (Washington, D.C.: Sept. 6, 2006).

Specifically, this management approach limited NOAA's insight and management involvement in the procurement of major elements of the system. NOAA officials reported that they are developing a management control plan with NASA and intend to perform an independent review of this plan when it is completed. They could not provide a time frame for its completion. Without strong NOAA oversight of NASA's management of program components, JPSS may continue to face the same cost, schedule, and contract management challenges as the NPOESS program.

While NOAA, NASA, and DOD acknowledge that there are risks associated with the transition to new programs, they have not yet established plans to mitigate these risks. Until these risks are effectively mitigated, it is likely that the satellite programs' costs will continue to grow and launch dates will continue to be delayed. Further launch delays are likely to jeopardize the availability and continuity of weather and climate data. For example, the POES satellite currently in the afternoon orbit is expected to reach the end of its lifespan at the end of 2012. If NPP is delayed, there could be a gap in polar satellite observations in the afternoon orbit. Similarly, a delay in the launch of the first JPSS satellite may lead to a gap in satellite data after NPP reaches the end of its lifespan.

Data continuity gaps pose different implications for DOD and NOAA. For both agencies, a loss of satellite data represents a reduction in weather forecasting capabilities. Within the military, satellite data and products allow military planners and tactical users to focus on anticipating and exploiting atmospheric and space environmental conditions. For example, accurate wind and temperature forecasts are critical to any decision to launch an aircraft that will need mid-flight refueling. For NOAA, satellite data and products are provided to weather forecasters for use in issuing weather forecasts and warnings to the public and to support our nation's aviation, agriculture, and maritime communities. NOAA also faces risks in losing longer-term climate observations. Maintaining the continuity of climate and space data over decades is important to identify long-term environmental cycles (such as the 11-year solar cycle and multiyear ocean cycles, including the El Niño effect) and their impacts, and to detect trends in global warming. Figure 5 shows the current and planned satellites and highlights gaps where the constellation is at risk.

Figure 5: Planned Launch Dates and Potential Gaps in Satellite Data



Source: GAO analysis of DOD, NOAA, and NPOESS Integrated Program Office data.

Note: DOD is currently evaluating its options for the early morning orbit, including moving the DMSP F-20 satellite to the early morning orbit or acquiring additional satellites. Launch dates and gaps for the early morning orbit will remain uncertain until these decisions are made.

NPOESS Development Continues, but Demonstration Satellite Has Been Delayed and New Challenges Threaten Further Delays

While NOAA and DOD are establishing plans for separate acquisitions, the development of key NPOESS components is continuing. In recent months, the critical VIIRS sensor has been completed and integrated onto the NPP spacecraft. In addition, the program continues to work on components of the first and second NPOESS satellites, including sensors and ground systems. These components may be transferred to NOAA and DOD to become part of their respective follow-on programs. However, the expected launch date of the NPP satellite has been delayed by 9 months due to technical issues in the development of a key sensor, and the development of the VIIRS sensor for the first NPOESS satellite is experiencing cost overruns. In addition, the program is slowing down and may stop work on key components in order to address potential contract liabilities and funding constraints. This would further delay the launches

of the NPP satellite and the first NOAA and DOD satellites under their new programs.

NPOESS Components Making Progress, but Technical Issues Have Delayed NPP Launch

In recent months, selected components of the NPOESS program have made progress. Specifically, the program completed the development of the critical VIIRS sensor and delivered it to NASA for integration onto the NPP satellite. Four of the five sensors intended for NPP are now on the spacecraft. In addition, the program has continued to develop key sensors intended for the first NPOESS satellite (VIIRS, CrIS, OMPS, and the Advanced Technology Microwave Sounder sensors), and a key sensor for the second NPOESS satellite (the Microwave Imager/Sounder). These components may be transferred to NOAA and DOD to become part of their respective follow-on programs.

However, the program experienced technical issues on the Cross-track Infrared Sounder (CrIS) sensor intended for the NPP satellite. Specifically, in January 2009 after the CrIS sensor completed its thermal vacuum tests, an anomaly was discovered on a circuit card that then led to the discovery of unrelated design flaws on two additional circuit cards. During final testing of new parts in August 2009, components intended for CrIS were damaged after the subcontractor failed to adhere to proper test processes. After investigating the problem and possible solutions for several months, the program decided to replace damaged parts and send the instrument through a limited thermal vacuum test. In total, this testing error resulted in an 11-month delay in the delivery of CrIS and a 9-month delay to the NPP satellite launch date (bringing it to September 2011, at the earliest). In addition, the program continues to face technical challenges and cost overruns in developing the VIIRS sensor for the first NPOESS satellite. Details on the status of key components for NPP and the first two NPOESS satellites are provided in table 7.

Table 7: Status of Key Components of NPP and the First Two NPOESS Satellites (C1 and C2), as of March 2010

Satellite	Component	Program-identified risk level[a]	Status
NPP	Advanced Technology Microwave Sounder	Low	The sensor was integrated on the spacecraft in December 2006 and is awaiting delivery of the other sensors in order to complete integration testing.
	Clouds and the Earth's Radiant Energy System	Low	The sensor was integrated on the spacecraft in November 2008.
	Cross-track Infrared Sounder (CrIS)	Medium	Technical, process, and testing errors have delayed the expected shipment of the CrIS sensor from July 2009 to June 2010, and it is driving the NPP schedule. The program office is preparing for a final review of the sensor.
	Ozone Mapping and Profiler Suite (OMPS)	Medium	OMPS has been integrated onto the spacecraft, but has had continued technical issues. After analysis of the issues, the program decided not to modify this sensor.
	Visible/Infrared Imager/ Radiometer Suite (VIIRS)	Low	The sensor was shipped to integration facilities in January 2010 and was integrated onto the NPP spacecraft.
	Spacecraft	Low	The spacecraft has been completed and four of five sensors have been integrated on it.
	Ground processing segment	Medium	An NPP compatibility test is planned for the fall of 2010, but it requires all sensors to be integrated onto the spacecraft. NASA officials reported that the ground system is still risky for NPP, and they plan to remain vigilant to fix issues.
NPOESS C1	Advanced Technology Microwave Sounder	Low	The sensor is currently being built by the prime contractor. Although the effort is low risk and over 80 percent complete, the effort is taking more time than expected.
	Clouds and the Earth's Radiant Energy System	Low	A contract for this sensor's development was awarded in May 2009; delivery is expected in July 2012.
	Cross-track Infrared Sounder (CrIS)	Medium	Because the program needed to delay activities on this sensor in 2009, delivery of the sensor could be delayed by a full year.
	Ozone Mapping and Profiler Suite (OMPS)	High	This sensor is about 45 percent complete, according to program officials; however, the contractor recently found contamination on the sensor during testing. Inspection and re-testing are expected to delay the OMPS schedule by about 2 months.
	Space Environment Monitor	High	The program office was late in awarding the contract for the second phase of this sensor; this will likely delay the sensor's development by a few months. DOD is currently evaluating whether to include this sensor on its follow-on program; a decision is to be made by October 2010.
	Total and Spectral Solar Irradiance Sensor	Low	The sensor development contract was awarded in July 2009.
	Visible/Infrared Imager/ Radiometer Suite (VIIRS)	High	According to program officials, this sensor is about 60 percent complete; however, it has continued to experience significant cost overruns.
	Spacecraft	Medium	The spacecraft is on the critical path for NPOESS C1, which means that any delays in the spacecraft could delay the launch date. DOD and NOAA are currently evaluating whether they will use this or another spacecraft for their follow-on programs.
	Ground processing segment	Low	Hardware for the final two central data processing centers is expected to be delivered by the end of 2013.

Satellite	Component	Program-identified risk level[a]	Status
NPOESS C2	Microwave Imager/Sounder	Low	Development for this sensor is continuing; a final decision on whether DOD will continue development will be made by the end of this fiscal year.

Source: GAO analysis of program office data.

[a]Although the NPOESS program office has determined these risk levels for program components, NOAA and NASA officials felt that the risk levels for the NPOESS VIIRS and Microwave Imager/Sounder sensors, spacecraft, and ground systems are too low and that the risk level of the NPOESS OMPS sensor is too high.

New Challenges Threaten Further Delays

In the months leading up to an official transition from the NPOESS program to the successor NOAA and DOD programs, NPOESS officials face key challenges that further threaten environmental satellite continuity. Specifically, the NPOESS program is slowing down and may stop work on key components in order to address potential contract liabilities and funding constraints. According to agency officials, the prime contract includes a clause requiring termination liability be funded in the current year's budget. This means that if NPOESS development were to continue according to schedule, the program would need to stop all development work in August 2010 in order to fund the approximately $84 million in potential termination liability for this year. To mitigate this risk, in April 2010, the prime contractor was directed to slow down work on all development activities so that work could continue through the end of the fiscal year.

In addition, the National Defense Authorization Act for Fiscal Year 2010 placed limitations on the amount of DOD funding available to the program until certain requirements were met.[25] Although the program met those requirements in March 2010, agency officials noted that DOD funding could be rescinded if not obligated quickly. According to program officials, if these funds are rescinded, DOD may have to terminate the NPOESS contract by the end of the fiscal year.

[25]Pub. L. No. 111-84 § 913 (Oct. 28, 2009). This act directs the President to develop a strategy for the management and funding of the NPOESS program that would include a funding profile for each year of the program by department or agency. The President is also required to develop an implementing plan to carry out the management and funding strategy. The act prohibits the Air Force from spending more than 50 percent of the funds available to it for NPOESS until the management and funding strategy is submitted to the relevant congressional committees. When the strategy is submitted, the Air Force is prohibited from spending more than 75 percent of the funds available to it for NPOESS until the implementation plan is submitted to the relevant congressional committees.

Slowing or stopping work under either scenario could further delay the launches of the NPP satellite and the first NOAA and DOD satellites under their new programs. However, officials have not established detailed priorities among different components to guide any work stoppages. Unless selected components are able to continue scheduled development, the launches of NPP and the first few satellites could be further delayed.

Limitations on the Demonstration Satellite May Adversely Affect the Usefulness of Its Data

As originally designed, NPP was planned to reduce the risk associated with launching new sensor technologies in the NPOESS program and to ensure continuity of climate data with NASA's Earth Observing System satellites. Therefore, NPP was not expected to be an operational satellite used for weather forecasting. However, in March 2009, delays in the expected launch of the first NPOESS satellite led the Executive Committee to decide to use NPP data operationally. Because the NPP demonstration satellite was not designed as an operational asset, it has several limitations. These limitations include fewer ground-based data processing systems, fewer security controls, and a shorter satellite lifespan than current or planned operational satellites. These design limitations mean that in some cases, NPP's data will not be as timely and useful as current polar satellites or as secure as planned satellites. In addition, there is a risk of a gap in the nation's climate and weather data should the NPP satellite or its sensors fail before the next satellite is launched. Agency officials acknowledge these limitations and are assessing options to make NPP data more timely and secure.

NPP Will Have Fewer Ground-Based Data Processing Systems than NPOESS

While NOAA, NASA, and DOD plan to have a ground-based data processing system in each of four central data processing centers when NPOESS (or its successors') satellites are in operation, the data processing system will be in only two of the centers for the NPP demonstration satellite.[26] This arrangement means that the two centers that do not have the data processing systems will experience a lag in obtaining NPP data. Specifically, under current operations, the four satellite data processing centers receive polar satellite data within about 100 to 150 minutes. NPP's

[26]The four central data processing centers are NOAA's National Environmental Satellite, Data, and Information Service, the Air Force Weather Agency, the Naval Oceanographic Office, and the Fleet Numerical Meteorology and Oceanography Center. The two centers that will have a ground-based data processing system when NPP is in orbit are NOAA's National Environmental Satellite, Data, and Information Service and the Air Force Weather Agency.

data will be available to the two centers with the data processing system within approximately 140 minutes; it will be available to the two other centers within about 170 minutes. This presents a delay of 20 to 70 minutes from current operations for the two centers without the data processing system.

Because of this delay, NPP data will not be as useful to DOD as the data from legacy DMSP and POES satellites. DOD officials reported that they plan to incorporate NPP data when and where they can to supplement data from the legacy satellites. However, DOD's centers will not be able to incorporate NPP data into all of their operational products, due to the time delay. For example, officials from one data processing center reported that the delay in obtaining NPP data could adversely affect their atmospheric and oceanographic numerical weather prediction capabilities. This situation would be exacerbated if POES or DMSP satellites fail in orbit before the first NPOESS/JPSS satellite is launched because the DOD centers may not be able to use NPP data to make up for the data loss. According to DOD officials, the three DOD centers are currently investigating options to shorten the time it will take for the data to go from the one center with the data processing system to the other two that lack the system, but do not have a timeline for making decisions on how to proceed. NASA officials reported that there are other options for shortening the time lag. For example, JPSS officials are considering accelerating the development of the data processing systems in their new program. This could allow all four centers to have a processing system shortly after NPP is launched and would eliminate the additional time lag for two of the centers.

NPP Was Designed Using Information Security Guidelines That Are Now Outdated

When originally designed, the NPP ground systems included information security controls that were based on the DOD security requirements that existed at that time. However, these standards—approved in 1998—do not include all of the security controls applicable to newer systems. According to NOAA officials, the limitations in NPP's security controls relate primarily to the risk of data loss, denial-of-service, and continuity of operations, rather than a risk to the command and control of the satellite.

In 2008, program officials evaluated the security requirements of the NPOESS program. Specifically, they evaluated whether to increase the security controls before the NPP launch, before the first NPOESS satellite launch, or before the second NPOESS satellite launch. They decided against updating the NPP security requirements, because it would cost the program up to $280 million to make such a change, and could risk NPP's

scheduled launch date. According to NOAA officials, they recently evaluated the impact of the weaknesses in NPP's security controls and made decisions on a majority of security controls in April 2010.

NPP's Expected Life Span Is Shorter than That of NPOESS

The NPP satellite was only designed to support a 5-year mission life, unlike the 7-year mission life of the NPOESS satellites. Because NPP's design life is only 5 years, it has the potential to fail before the next satellite is launched. If NPP launches as planned in October 2011, the satellite, based on current design, may remain functional until 2016. Thus, data from the next polar-orbiting satellite may be needed as early as 2016.

Although the first JPSS satellite launch is planned for 2015, it may need a year or more to perform an on-orbit accuracy check.[27] Thus, it is very likely that there will be gaps in climate and weather data if NPP cannot survive beyond its design life. Further delays in the development and launch of the next satellite will increase the risk of a gap. NOAA officials acknowledge this limitation and are evaluating ways to mitigate the risk of a gap. NASA officials reported that the NPP spacecraft is based on a legacy design; thus, they estimate that the spacecraft will likely last for 7 years or more. However, they questioned the reliability of key sensors—particularly VIIRS, CrIS, and OMPS—on NPP, due to poor workmanship and mission assurance weaknesses during development.

Conclusions

At the end of this fiscal year, the federal government will have spent 16 years and over $5 billion to combine two legacy satellite programs into one, yet will not have launched a single satellite. Faced with expected cost growth exceeding $8 billion, schedule delays of over 5 years, and continuing tri-agency management challenges, a task force led by the President's Office of Science and Technology Policy decided to disband NPOESS so that NOAA and DOD could pursue separate satellite acquisitions. While the two agencies are scrambling to develop plans for their respective programs, it is not yet clear what the programs will deliver, when, and at what cost. Timely decisions on cost, schedule, and capabilities are needed to allow both acquisitions to move forward. As the agencies develop plans for their respective satellite programs, they face

[27]After a satellite has been launched, scientists perform an on-orbit accuracy check, called calibration and validation, to verify that the sensors accurately report ground and atmospheric conditions. While this process can take 6 months to 2 years, users may be able to use the satellite data before calibration and validation has been completed.

risks associated with the loss of critical staff with knowledge and experience, delays in negotiating contract changes and setting up new program offices, the two agencies not fulfilling each other's core requirements, and insufficient program oversight. Neither agency has developed plans to mitigate these risks.

Until the transition is completed, the NPOESS program is continuing to develop components of the NPP satellite and components of the first two satellites. However, program officials reported that they have slowed all development work, and may need to stop work on these deliverables because of potential contract liabilities and funding constraints. Slowing or stopping work could further delay the satellites' launches, and the program has not developed a prioritized list of what to stop first to mitigate impacts on satellite launches. Until it does so, there may be an increased risk of gaps in satellite data.

Because NPP was built to be a demonstration satellite, its data may not be as timely and useful as current polar satellites and not as secure as planned satellites. In addition, the limited lifespan of NPP further increases the risk of gaps in climate and weather data. Agency officials acknowledge these limitations and are assessing options to make NPP data more timely, but do not have time frames for deciding among alternative options.

Recommendations for Executive Action

In order to ensure that the transition from NPOESS to its successor programs is efficiently and effectively managed, we recommend that the Secretaries of Defense and Commerce take the following four actions:

- direct their respective NPOESS follow-on programs to expedite decisions on the expected cost, schedule, and capabilities of their planned programs;
- direct their respective NPOESS follow-on programs to develop plans to address key transition risks, including the loss of skilled staff, delays in contract negotiations and setting up new program offices, loss of support for the other agency's requirements, and oversight of new program management;
- direct the NPOESS program office to develop priorities for work slowdown and stoppage to allow the activities that are most important to maintaining launch schedules to continue; and

- direct NOAA and DOD officials to develop time frames for making key decisions on—or accepting the risks related to—the timeliness of NPP's data.

Agency Comments and Our Evaluation

We received written comments on a draft of this report from the Secretary of Commerce, who transmitted NOAA's comments (see app. II), the Director of Space and Intelligence within DOD (see app. III), and the Associate Administrator for the Science Mission Directorate of NASA (see app. IV). In addition, a senior policy analyst from the Office of Science and Technology Policy/Executive Office of the President provided technical comments on a draft of this report via email, which we incorporated as appropriate.

In their comments, both NOAA and DOD agreed with our recommendations and identified plans to implement them. For example, NOAA plans to work with NASA to develop requirements and acquisition plans, identify the organization and staffing, and establish a cost and schedule baseline for JPSS. In addition, DOD officials reported that the agency plans to make decisions on capability, cost, and schedule following a series of meetings taking place in June 2010.

In addition, regarding the potential need to slow down or stop work on the NPOESS program to deal with potential contract liabilities and funding constraints, NOAA, NASA, and DOD reported that the NPOESS program office has identified priorities for work stoppage so that key activities could continue. At the end of March 2010, the program executive officer provided high-level guidance on the priorities of the program, such as ensuring that NPP development continues and ensuring that key sensor development is transferred to the JPSS program. Subsequently, program officials stated that the contractor agreed to slow all of its development work through the end of the fiscal year to avoid a work stoppage. However, slowing all work activities does not reflect a prioritization of the most important activities. Unless the key activities that are on the critical path are able to continue scheduled development, the launches of NPP and the first few satellites could be further delayed.

NASA also commented on our finding that NOAA would need to provide enhanced oversight of NASA's management of the JPSS program. We called for enhanced oversight based, in part, on NASA's history of poor performance in managing major acquisitions. NASA officials asserted that the proper basis for comparison should not be their leading edge research missions, but, instead, should be the operational environmental satellite

missions it has developed for NOAA in the past. NASA noted that its role in JPSS will be structured similar to the Polar-orbiting Operational Environmental Satellite (POES) and Geostationary Operational Environmental Satellite (GOES) programs, where NOAA and NASA have a long and effective partnership. However, we believe that enhanced oversight is warranted. The JPSS program differs from the recent POES and GOES programs in that it includes leading edge sensor technologies. The complexity of these sensor technologies has been a key reason for the cost growth and schedule delays experienced to date on the NPOESS program. In addition, the program continues to discover technical problems on the sensors currently being developed for the follow-on programs. Thus, it will be important for both NOAA and NASA to ensure that the subcontractors are adequately managed so that technical, cost, and schedule issues are minimized or mitigated.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution of it until 30 days from the date of this letter. We are sending copies of this report to interested congressional committees, the Secretary of Commerce, the Secretary of Defense, the Administrator of NASA, the Director of the Office of Management and Budget, and other interested parties. In addition, this report will be available on the GAO Web site at http://www.gao.gov.

If you have any questions about this report, please contact me at (202) 512-9286 or at pownerd@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix V.

David A. Powner
Director, Information Technology
Management Issues

Appendix I: Objectives, Scope, and Methodology

Our objectives were to (1) assess efforts to plan for separate satellite acquisitions; (2) evaluate the status and risks of key program components still under development; and (3) evaluate implications of using the demonstration satellite's data operationally.

To assess efforts to plan for separate satellite acquisitions, we reviewed the presidential directive that established the National Polar-orbiting Operational Environmental Satellite System (NPOESS) as well as materials related to the program restructuring in 2006. We also reviewed the White House task force's terms of reference and final decision to disband the NPOESS program. We reviewed preliminary plans for the National Oceanic and Atmospheric Administration's (NOAA) new program to replace two of the NPOESS satellites. We compared the strategy and plans to best practices for program planning and requirements management and met with members of the task force responsible for the final restructuring decision. We also interviewed agency officials from the Department of Defense (DOD), the National Aeronautics and Space Administration (NASA), and NOAA, as well as members of the NPOESS task force and the NPOESS program office.

To evaluate the status and risks of key program components, we reviewed briefings, weekly updates, and monthly program management reports. We reviewed cost reports and program risk management documents and interviewed program officials to determine program and program segment risks that could negatively affect the program's ability to maintain the current schedule and cost estimates. We also interviewed agency officials from DOD, NASA, and NOAA and the NPOESS program office to determine the status and risks of the key program segments. We also observed senior-level management review meetings to obtain information on the status of the NPOESS program.

To evaluate plans for and implications of using the demonstration satellite's data operationally, we reviewed program documentation for using the demonstration satellite's data and compared them to plans for using the NPOESS satellite data. Additionally, we interviewed program office, NOAA, NASA, and DOD officials about plans for using the data.

We primarily performed our work at the NPOESS Integrated Program Office and at DOD, NASA, and NOAA offices in the Washington, D.C., metropolitan area. In addition, we conducted work at the Fleet Numerical Meteorology and Oceanography Center in Monterey, California; the Naval Oceanographic Office in Bay St. Louis, Mississippi; and the Air Force Weather Agency in Omaha, Nebraska.

We conducted this performance audit from August 2009 to May 2010 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.

Appendix II: Comments from the Department of Commerce

UNITED STATES DEPARTMENT OF COMMERCE
The Secretary of Commerce
Washington, D.C. 20230

May 13, 2010

Mr. David A. Powner
Director
Information Technology Management Issues
Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

Dear Mr. Powner:

Thank you for the opportunity to review and comment on the Government Accountability Office's draft report entitled "Polar-orbiting Environmental Satellites: Agencies Must Act Quickly to Address Risks that Jeopardize the Continuity of Weather and Climate Data" (GAO-10-558).

On behalf of the Department of Commerce, I have enclosed the National Oceanic and Atmospheric Administration's programmatic comments to the draft report.

Sincerely,

Gary Locke

Enclosure

Department of Commerce
National Oceanic and Atmospheric Administration
Comments to the Draft GAO Report Entitled
"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)

General Comments

The Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) appreciates the opportunity to review the Government Accountability Office's (GAO) report on polar-orbiting environmental satellites. The following is NOAA's response to recommendations found in the draft report, as well as recommended changes for factual/technical information.

NOAA Response to GAO Recommendations

The draft GAO report states, "In order to ensure that the transition from [the National Polar-orbiting Operational Environmental Satellite System (NPOESS)] to its successor programs is efficiently and effectively managed, we recommend that the Secretaries of Defense and Commerce take the following four actions:"

Recommendation 1: "Direct their respective NPOESS follow-on programs expedite decisions on the expected cost, schedule, and capabilities of their planned programs."

NOAA Response: NOAA agrees with this recommendation. A transition team has been formed to manage the activities of transitioning the NPOESS activities to the Joint Polar Satellite System (JPSS) program. This team includes representatives from NOAA, the National Aeronautics and Space Administration (NASA) and the Department of Defense (DoD). DoD issued an Acquisition Decision Memorandum (ADM) on March 17, 2010, which directs the NPOESS Program Executive Officer to transition the NPOESS activities to JPSS and DoD (U.S. Air Force). These activities are underway. NOAA and NASA have signed a memorandum of understanding (MOU) to begin transition activities, which will focus on the cost, schedule and performance capabilities of the JPSS program.

Recommendation 2: "Direct their respective NPOESS follow-on programs to develop plans to address key transition risks, including the loss of skilled staff, delays in contract negotiations and setting up new program offices, loss of support for the other agency's requirements, and oversight of new program management."

NOAA Response: NOAA agrees with this recommendation. Under the NOAA NASA Transition MOU, the agencies will define the system concept for JPSS, set the level-1 requirements, establish the acquisition plans, determine the organization and staffing needed to run the program, and establish a schedule and cost baseline. Each of these will be subject to internal program management councils and to external independent review teams.

Recommendation 3: "Direct the NPOESS program office to develop priorities for work stoppage to allow the activities that are most important to maintaining launch schedules to continue."

NOAA Response: NOAA agrees with this recommendation. On March 17, 2010, DoD signed the Acquisition Decision Memorandum (ADM), "National Polar-orbiting Operational Satellite System (NPOESS) Program Restructure." In turn, the Program Executive Officer (PEO) provided ADM implementation guidance to the NPOESS System Program Director (SPD) on March 26, 2010. This guidance outlines priorities for work stoppage and provides transition guidance for those activities most important to maintaining launch schedules. Subsequently, the PEO and SPD have worked to refine the specifics of implementing the ADM.

Recommendation 4: "Direct NOAA and DOD officials to develop timeframes for making key decisions on–or accepting the risks related to–the timeliness of [NPOESS Preparatory Project's (NPP's)] data."

NOAA Response: NOAA agrees with this recommendation. The NPP data will be collected once per orbit and provided to users with timeliness comparable to the data from the current Polar-orbiting Operational Environmental Satellites (POES) and Metop satellites. NOAA continues its preparation to use NPP data on an operational basis. NOAA is also working to increase the number of products that will be available to users within the first 18 months from launch from 19 products to 54.

Appendix III: Comments from the Department of Defense

OFFICE OF THE UNDER SECRETARY OF DEFENSE
3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

ACQUISITION,
TECHNOLOGY
AND LOGISTICS

MAY 2 4 2010

Mr. David A. Powner
Director, Information Technology and Management Issues
U.S. Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Powner,

This is the Department of Defense (DoD) response to the GAO draft report, GAO-10-558, "POLAR-ORBITING ENVIRONMENTAL SATELLITES: AGENCIES MUST ACT QUICKLY TO ADDRESS RISKS THAT JEOPARDIZE THE CONTINUITY OF WEATHER AND CLIMATE DATA" dated May 1, 2010 (GAO Code 311214).

DoD acknowledges receipt of the DRAFT report and concurs with the recommendations.

Our complete response is attached.

Sincerely,

Mr. Gil I. Klinger
Director (Space & Intelligence)

Enclosure:
DoD Response to GAO-10-558

Distribution:
DoD IG
ASD(NII) DASD (C3I, Space and Spectrum)
SAF/USA

GAO DRAFT REPORT DATED APRIL 13, 2010
GAO-10-558 (GAO CODE 311214)

"POLAR-ORBITING ENVIRONMENTAL SATELLITES: AGENCIES MUST ACT QUICKLY TO ADDRESS RISKS THAT JEOPARDIZE THE CONTINUITY OF WEATHER AND CLIMATE DATA"

DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATIONS

RECOMMENDATION 1: The GAO recommends that the Secretary of Defense direct the DoD National Polar-Orbiting Operational Environmental Satellite System (NPOESS) follow-on program expedite decisions on the expected cost, schedule, and capabilities of their planned programs (p. 38/GAO Draft Report)

DoD RESPONSE: Concur. The DoD agrees that expedited decisions are necessary to ensure FY10 funds are applied where most needed. Decisions on the DoD early morning orbit program will be executed per established acquisition guidelines. USD(AT&L) issued Acquisition Decision Memorandums on 17 March and 10 May 2010. Decisions on capability, cost, and schedule will be made following the next round of critical decision meetings in mid June.

RECOMMENDATION 2: The GAO recommends that the Secretary of Defense direct the DoD NPOESS follow-on program to develop plans to address key transition risks, including the loss of skilled staff, delays in contract negotiations and setting up a new program office, loss of support for the other agency's requirements, and oversight of new program management. (p. 38/GAO Draft Report)

DoD RESPONSE: Concur. The DoD is assessing numerous risks associated with the transition. The DoD will ensure personnel for this effort have the requisite experience and skills (e.g. contracting, program management, systems engineering) to effectively manage the program.. The DoD will continue to work with NOAA to ensure that common areas (such as the NPOESS ground, C2, and IDPS) capabilities are arranged as necessary to support other agency needs.

RECOMMENDATION 3: The GAO recommends that the Secretary of Defense direct the NPOESS program office to develop priorities for work stoppage to allow the activities that are most important to maintaining launch schedules to continue. (p. 38/GAO Draft Report)

Attachment

DoD RESPONSE: Concur. On 17 March, the Under Secretary of Defense for Acquisition, Technology and Logistics signed the "Acquisition Decision Memorandum (ADM), National Polar-orbiting Operational Satellite System (NPOESS) Program Restructure." In turn, the Acting Program Executive Officer for Environmental Satellites (PEO/ES), provided ADM implementation guidance to the NPOESS System Program Director (SPD) on 26 March 2010. This guidance outlines priorities for work stoppage and provides transition guidance for those activities most important to maintaining launch schedules. Subsequently, the PEO and SPD have worked to refine the specifics of implementing the ADM.

RECOMMENDATION 4: The GAO recommends that the Secretary of Defense direct DoD officials to develop timeframes for making key decisions on – or accepting the risks related to – the timeliness of NPP's data (p. 38/GAO Draft Report)

DoD RESPONSE: Concur. DoD has accepted the current limitations on the timeliness of NPP data. We will continue to work with our agency partners to make sure the NPOESS follow-on data is made available in as timely a manner to support warfighter missions.

Attachment

Appendix IV: Comments from the National Aeronautics and Space Administration

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

MAY 14 2010

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

Mr. David A. Powner
Director, Information Technology Management Issues
U.S. Government Accountability Office
Washington, DC 20548

Dear Mr. Powner:

NASA appreciates the opportunity to comment on your draft report entitled, "Polar-Orbiting Environmental Satellites: Agencies Must Act Quickly to Address Risks that Jeopardize the Continuity of Weather and Climate Data" (GAO-10-558). While no recommendations in the report were directed to NASA, the report contains a few points that require clarification.

With regard to the "Insufficient Oversight of New Program Management," section on page 28, the proper basis for comparison is not NASA's leading edge research missions, but the operational environmental satellite missions it has developed for NOAA in the past. NASA's role in the restructured program will be modeled after the procurement structure of the successful Polar Operational Environmental Satellite (POES) and Geostationary Operational Environmental Satellite (GOES) programs, where NASA and NOAA have a long and effective partnership. NOAA personnel will be integrated into the management structure and will co-chair the Program Management Councils that will govern the program. NOAA has identified and assigned a NOAA Program Director who works within the NASA Joint Agency Satellite Division to ensure timely and effective NOAA oversight.

With regard to the termination liability issue discussed on page 33, the Integrated Program Office (IPO), in consultation with NASA, NOAA, and DoD, provided direction to the prime contractor in early April that allows effort to continue through the end of the fiscal year. This plan stays within the allotted NOAA and DoD funding and maintains the termination liability funds, eliminating the necessity for a stop work order. It is critical that the sensor and ground system work continue without impact to the NPP mission environmental testing and planned launch in 2011.

Thank you again for the opportunity to review and comment on this draft report. We look forward to your final report to Congress.

Sincerely,

Edward J. Weiler
Associate Administrator for
Science Mission Directorate

Appendix V: GAO Contact and Staff Acknowledgments

GAO Contact

David A. Powner (202) 512-9286 or pownerd@gao.gov

Staff Acknowledgments

In addition to the contact named above, Colleen Phillips, Assistant Director; Kate Agatone; Neil Doherty; Franklin Jackson; Lee McCracken; and Matthew Strain made key contributions to this report.

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