United States Government Accountability Office

GAO

Report to Congressional Requesters

June 2009

POLAR-ORBITING ENVIRONMENTAL SATELLITES

With Costs Increasing and Data Continuity at Risk, Improvements Needed in Tri-agency Decision Making

GAO

Accountability * Integrity * Reliability

GAO-09-564

June 2009

GAO
Accountability•Integrity•Reliability
Highlights

Highlights of GAO-09-564, a report to congressional requesters

POLAR-ORBITING ENVIRONMENTAL SATELLITES

With Costs Increasing and Data Continuity at Risk, Improvements Needed in Tri-agency Decision Making

Why GAO Did This Study

The National Polar-orbiting Operational Environmental Satellite System (NPOESS) is a tri-agency acquisition—managed by the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), the Department of Defense (DOD), and the National Aeronautics and Space Administration (NASA)—that has experienced escalating costs, schedule delays, and technical difficulties. As the often-delayed launch of its demonstration satellite draws closer, these problems continue.

GAO was asked to (1) identify the status and risks of key program components, (2) assess the NPOESS Executive Committee's ability to fulfill its responsibilities, and (3) evaluate efforts to identify an alternative system integrator for later NPOESS satellites. To do so, GAO analyzed program and contractor data, attended program reviews, and interviewed agency officials.

What GAO Recommends

GAO is making recommendations to the Secretaries of Commerce and Defense and to the Administrator of NASA to improve the effectiveness and efficiency of the Executive Committee. In commenting on a draft of this report, NASA and Commerce officials concurred with the recommendations; DOD concurred with one and partially concurred with the other recommendations.

View GAO-09-564 or key components.
For more information, contact David A. Powner at (202) 512-9286 or pownerd@gao.gov.

What GAO Found

While selected components of the NPOESS program have made progress over the past year, the program is once again over budget and behind schedule. In terms of progress, three of the five instruments slated for a demonstration satellite (called the NPOESS Preparatory Project—NPP) have been delivered and integrated on the spacecraft; the ground-based satellite data processing system has been installed and tested at both of the locations that are to receive NPP data; and the satellites' command, control, and communications system has passed acceptance testing. However, the program's approved cost and schedule baseline are not achievable, and problems with two critical sensors continue to drive the program's cost and schedule. Costs could grow by $1 billion over the current $13.95 billion estimate, and the schedules for NPP and the first two NPOESS satellites are expected to be delayed by 7, 14, and 5 months, respectively. These delays increase the risk of a gap in satellite continuity. An independent review team established to assess key program risks recently reported that the constellation of satellites is extremely fragile, and that there could be a 3 to 5 year gap in satellite coverage if NPP, NPOESS, or other DOD satellites fail on launch.

The NPOESS Executive Committee responsible for overseeing the program has made improvements over the last several years, but still has not effectively fulfilled its responsibilities. Responding to past concerns expressed by GAO and the Department of Commerce's Inspector General, the Committee now meets on a regular basis, and has sought and reacted to advice from external advisors to mitigate specific risks. However, the Committee lacks the membership and leadership needed to effectively and efficiently oversee and direct the program. Specifically, the DOD Committee member with acquisition authority does not attend Executive Committee meetings—and sometimes contradicts the Committee's decisions, the Committee does not track its action items to closure, and many of the Committee's decisions do not achieve desired outcomes. Program officials and external independent reviewers explained that it is extremely difficult for the Committee to navigate three agencies' competing requirements and priorities. Until these shortfalls are addressed, the Committee will remain ineffective.

The NPOESS program has conducted two successive studies of alternatives to using the existing system integrator for the last two NPOESS satellites, but neither identified a viable alternative to the current contractor. Both studies assessed a variety of alternatives, including re-competing the entire prime contract, obtaining an independent system integrator while having the existing prime contractor continue to develop space and ground components, and having the government take over responsibility for the system's integration. The first study identified strengths and weaknesses and the second study identified high-level costs and benefits. Neither study identified an alternative that is viable. Program officials plan to conduct a final study prior to the June 2010 decision on whether to proceed with the existing prime contractor.

Contents

Letter 1

Background 3
Progress Made, but Continued Instrument Problems Are Driving Costs Upward, Forcing Launch Delays, and Endangering Satellite Continuity 16
Executive Committee Has Not Effectively Fulfilled Its Responsibilities 21
Program Has Assessed Alternatives, but Has Not Yet Identified a Viable Alternative for Acquiring the Last Two NPOESS Satellites 27
Conclusions 28
Recommendations for Executive Action 28
Agency Comments and Our Evaluation 29

Appendix I **Objectives, Scope, and Methodology** 33

Appendix II **Summary of the Fall 2008 Independent Review Team's Findings and Recommendations** 35

Appendix III **Comments from the Department of Commerce** 37

Appendix IV **Comments from the Department of Defense** 41

Appendix V **Comments from the National Aeronautics and Space Administration** 44

Appendix VI **GAO Contact and Staff Acknowledgments** 46

Tables

Table 1: Expected NPOESS Instruments as of August 31, 2004 8
Table 2: Major Changes to the NPOESS Program by the Nunn-McCurdy Certification Decision 11
Table 3: Changes to NPOESS Instruments, as of June 2006 12
Table 4: Configuration of Instruments Planned for NPP and NPOESS Satellites, as of May 2008 14
Table 5: Status and Risk Level of Key Space and Ground Components, as of April 2009 16
Table 6: Changes in Key Program Milestones over Time 19

Figures

Figure 1: Configuration of Operational Polar Satellites 4
Figure 2: Stages of Satellite Data Processing 5
Figure 3: Examples of Weather Products 5
Figure 4: NPOESS Program Roles and Responsibilities 7
Figure 5: Nunn-McCurdy Certified Satellite Constellation 12
Figure 6: Potential Gaps in the Continuity of Current and Planned Polar Satellites 20

Abbreviations

CrIS	Cross-track Infrared Sounder
DMSP	Defense Meteorological Satellite Program
DOD	Department of Defense
EDR	Environmental Data Record
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
POES	Polar-orbiting Operational Environmental Satellites
VIIRS	Visible/infrared imager radiometer suite

This is a work of the U.S. government and is not subject to copyright protection in the United States. The published product may be reproduced and distributed in its entirety without further permission from GAO. However, because this work may contain copyrighted images or other material, permission from the copyright holder may be necessary if you wish to reproduce this material separately.

GAO
Accountability * Integrity * Reliability

United States Government Accountability Office
Washington, DC 20548

June 17, 2009

Congressional Requesters

The planned National Polar-orbiting Operational Environmental Satellite System (NPOESS) program is expected to be a state-of-the-art, environment-monitoring satellite system that will replace two existing polar-orbiting environmental satellite systems. Polar-orbiting satellites provide data and imagery that are used by weather forecasters, climatologists, and the military to map and monitor changes in weather, climate, the oceans, and the environment. The NPOESS program is considered critical to the United States' 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.

Three agencies share responsibility for the NPOESS acquisition: the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), the Department of Defense (DOD)/United States Air Force, and the National Aeronautics and Space Administration (NASA). These agencies established a tri-agency office to manage the NPOESS program. The program is overseen by an Executive Committee made up of senior executives from each of the agencies. Since its inception, NPOESS costs have doubled, launch schedules have been repeatedly delayed, and significant functionality was cut from the program. Even after a major restructuring, the program is still encountering technical issues, schedule delays, and the likelihood of further cost increases. More importantly, delays in launching the satellites have put the program's mission at risk.

This report responds to your request that we (1) identify the status and risks of key program components, (2) assess the NPOESS Executive Committee's ability to fulfill its responsibilities, and (3) evaluate efforts to identify an alternative system integrator for later NPOESS satellites. To identify the status and risks to the program, we reviewed program documentation including status briefings, monthly program management documents, and contractor-provided earned value data. We compared the contractor's earned value management data to cost and schedule estimates and evaluated reasons for variances in the contractor's performance. To assess the NPOESS Executive Committee's ability to fulfill its responsibilities, we reviewed Executive Committee documentation, including meeting minutes. We compared the Committee's actions to its documented responsibilities, as well as to best practices in

investment management and oversight.[1] To evaluate the efforts to develop an alternative system integrator for NPOESS, we compared the requirement for a study of alternatives to the results of two successive studies. We also interviewed relevant agency officials from NOAA, NASA, and DOD. In addition, this report builds on work we have done on environmental satellites over the last several years.[2]

We conducted our work at the NPOESS Integrated Program Office headquarters and at NOAA, NASA, and DOD facilities in the Washington, D.C., metropolitan area. In addition, we conducted work at contractors' facilities in the Los Angeles, California, area because of the importance of these sites to development of the sensors for the program and to the satellites' integration. We conducted this performance audit from October 2008 to June 2009 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.

[1]GAO, *Information Technology Investment Management: A Framework for Assessing and Improving Process Maturity*, GAO-04-394G (Washington, D.C.: March 2004).

[2]GAO, *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).

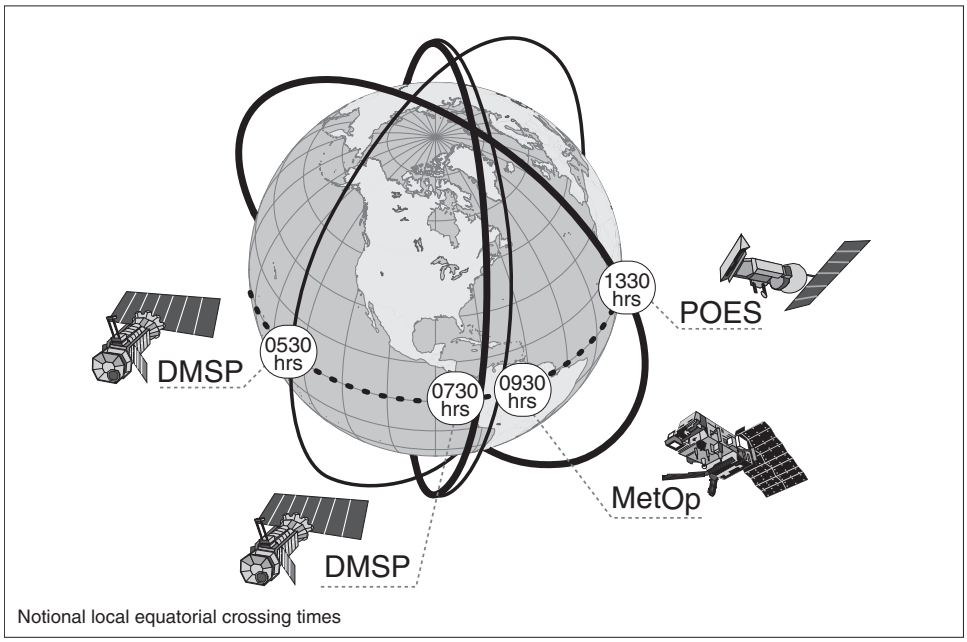
Background

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. 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 3 or more 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 can observe the earth in early morning, midmorning, and early afternoon polar orbits. In addition, the government is also relying on a European satellite, called the Meteorological Operational (MetOp) satellite, in the midmorning orbit.[3] Together, they ensure that, for any region of the earth, the data provided to users are generally no more than 6 hours old. Figure 1 illustrates the current operational polar satellite configuration. 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 continue to launch its three remaining DMSP satellites every few years, with the final launch planned for 2014.

[3]The European 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.

Figure 1: Configuration of Operational Polar Satellites



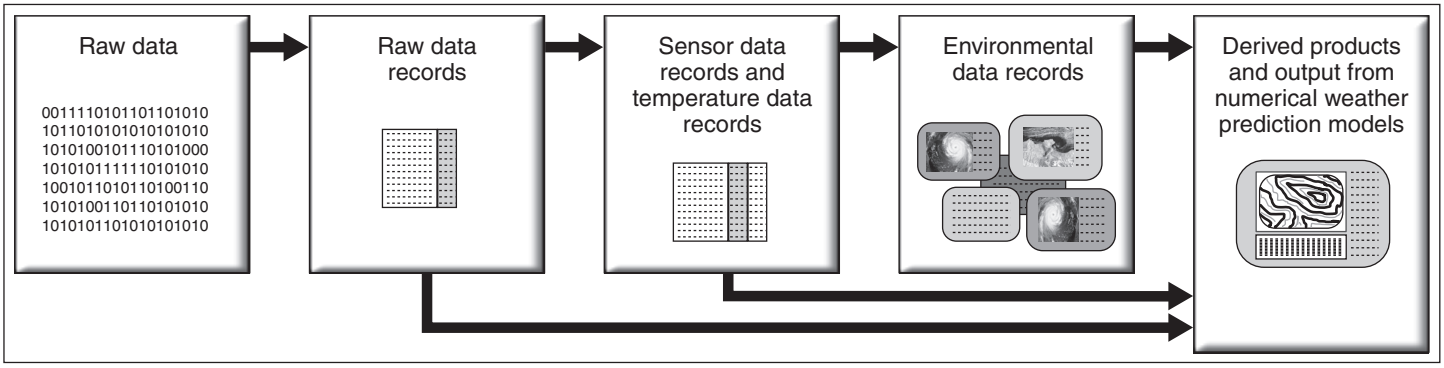
Sources: GAO analysis of NPOESS program office data; MapArt (globe).

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, the 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 (EDR). EDRs 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

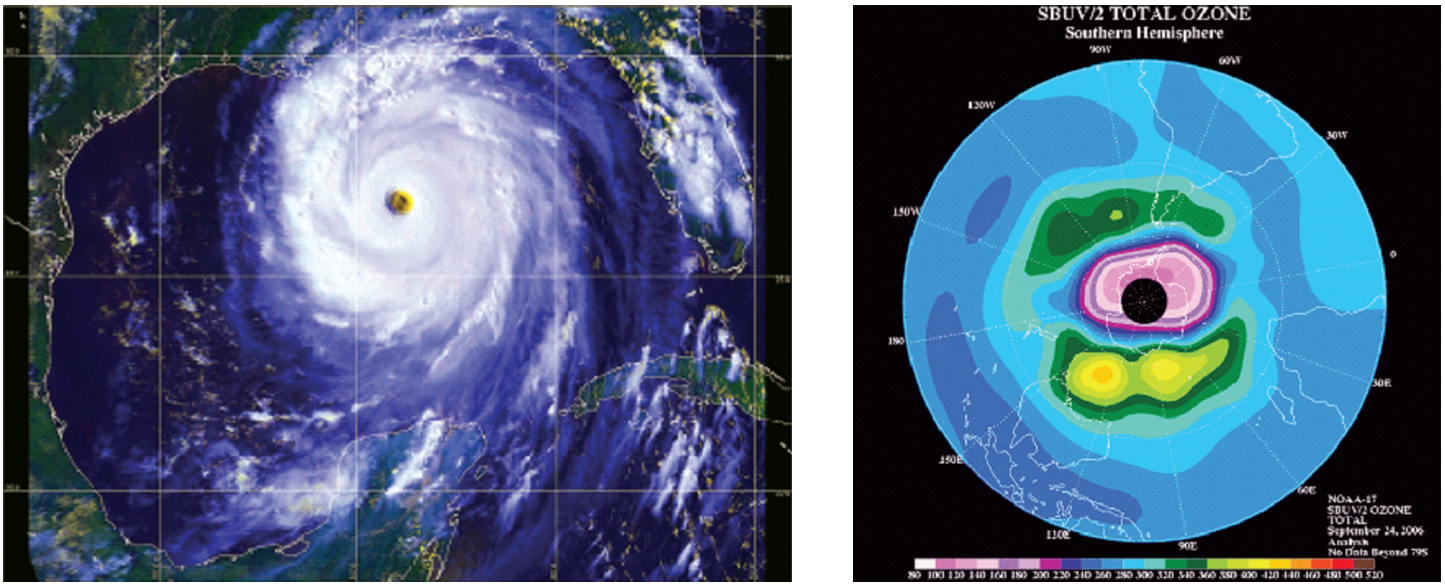
models and assessments of climate trends. Figure 2 is a simplified depiction of the various stages of satellite data processing, and figure 3 depicts examples of two different weather products.

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, and the figure on the right is an analysis of ozone concentration produced from POES satellite data.

NPOESS Overview

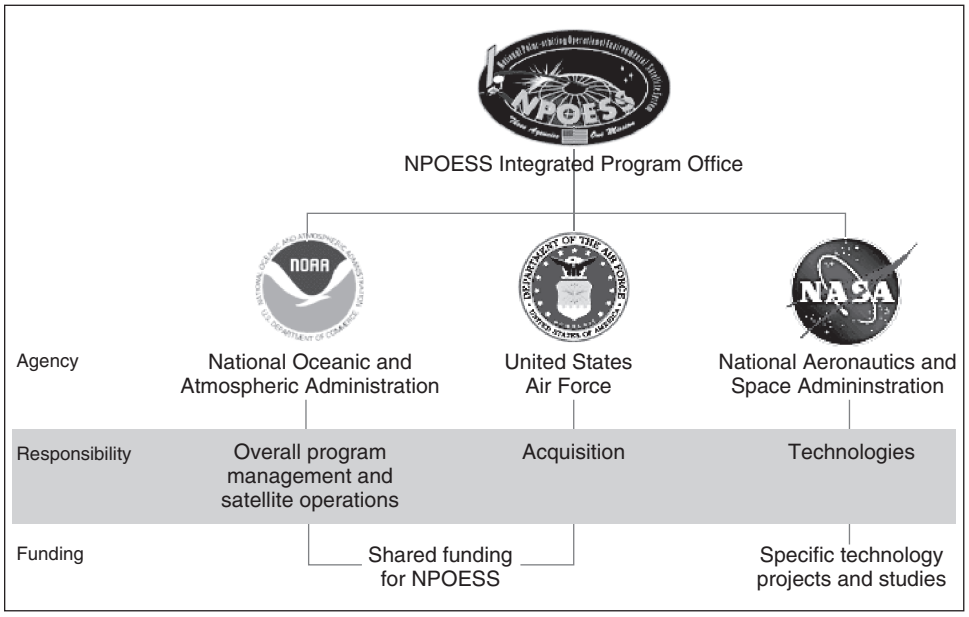
With the expectation that combining the POES and DMSP programs would reduce duplication and result in sizable cost savings, a May 1994 Presidential Decision Directive required NOAA and DOD to converge the two satellite programs into a single satellite program capable of satisfying both civilian and military requirements.[4] The converged program, NPOESS, is considered critical to the United States' ability to maintain the continuity of data required for weather forecasting and global climate monitoring. To manage this program, DOD, NOAA, and NASA formed the 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 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.[5] Figure 4 depicts the organizations that make up the NPOESS program and lists their responsibilities.

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

[5]The Under Secretary of Defense for Acquisition, Technology, and Logistics delegated the responsibility for attending the meetings—but not the authority to make acquisition decisions—to the Under Secretary of the Air Force.

Figure 4: NPOESS Program Roles and Responsibilities



Source: GAO analysis of NPOESS program office data.

Acquisition Strategy

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 is to provide satellite development, satellite launch and operation, and ground-based satellite data processing. These deliverables are grouped into four main categories: (1) the space segment, which includes the satellites and sensors; (2) the integrated data processing segment, which is the system for transforming raw data into EDRs and is to be located at the four processing centers; (3) the command, control, and communications segment, which includes the equipment and services needed to support satellite operations; and (4) the launch segment, which includes the launch vehicle services.

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 nonenvironmental search

and rescue efforts, sensor survivability, and environmental data collection activities. The program office considered four of the sensors to be critical because they provide data for key weather products; these sensors are in bold in table 1, which describes each of the expected NPOESS instruments.

Table 1: Expected NPOESS Instruments as of August 31, 2004 (critical sensors are in bold)

Instrument	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.
Aerosol polarimetry sensor	Retrieves specific measurements of clouds and aerosols (liquid droplets or solid particles suspended in the atmosphere, such as sea spray, smog, and smoke).
Conical-scanned microwave imager/sounder	Collects microwave images and data needed to 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.
Data collection system	Collects environmental data from platforms around the world and delivers them to users worldwide.
Earth radiation budget 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 mapper/profiler suite	Collects data needed to measure the amount and distribution of ozone in the earth's atmosphere. Consists of two components (limb and nadir) which can be provided separately.
Radar altimeter	Measures variances in sea surface height/topography and ocean surface roughness, which are used to determine sea surface height, significant wave height, and ocean surface wind speed and to provide critical inputs to ocean forecasting and climate prediction models.
Search and rescue satellite aided tracking system	Detects and locates aviators, mariners, and land-based users in distress.
Space environmental sensor suite	Collects data to identify, reduce, and predict the effects of space weather on technological systems, including satellites and radio links.
Survivability sensor	Monitors for attacks on the satellite and notifies other instruments in case of an attack.
Total 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.

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 to ensure continuity of climate data with NASA's Earth Observing System satellites. NPP was to host three of the four critical NPOESS sensors, as well as one other sensor and to provide

the program office and the processing centers an early opportunity to work with the sensors, ground control, and data processing systems.[6] When the NPOESS development contract was awarded, 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.[7] 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.

Cost Increases, Schedule Delays, and Technical Problems Led to a Decision to Restructure the NPOESS Program

Over several years, we reported that NPOESS had experienced continued cost increases, schedule delays, and serious technical problems.[8] 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 the VIIRS sensor and 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 growth exceeds certain cost thresholds.[9] Key provisions of the law require the Secretary of Defense to notify Congress when a major defense acquisition is expected to overrun its current baseline by 15 percent or more and to certify the program to Congress when it is expected to overrun its current baseline by 25 percent

[6]The four sensors are the Visible/infrared imager radiometer suite, the Cross-track infrared sounder, the Advanced technology microwave sounder, and the Ozone mapper/profiler suite. NPP will now also host the Clouds' and earth's radiant energy system sensor.

[7]In general, satellite experts anticipate that roughly 1 out of every 10 satellites will fail either during launch or during early operations after launch.

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

[9]10 U.S.C. § 2433 is commonly referred to as Nunn-McCurdy.

or more.[10] In November 2005, NPOESS exceeded the 25 percent threshold, and DOD was required to certify the program. Certifying a program entails providing 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 2026—an increase of $4 billion more than the prior life cycle cost estimate.[11] This restructuring decision delayed the launch of NPP and the first 2 satellites by roughly 3 to 5 years—a deviation from NOAA's 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 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 sensors from 13 to 9 and reduced the functionality of 4 sensors.

In addition, a new executive position—called the Program Executive Officer—was established to oversee the NPOESS program office and to report directly to the Executive Committee. The Program Executive Officer obtains weekly and monthly reports on the program's cost, schedule, performance, and risks from the System Program Director, and in turn, provides monthly and quarterly updates to the Executive Committee. Table 2 summarizes the major program changes made by the Nunn-McCurdy certification decision, and figure 5 denotes the

[10] 10 U.S.C. § 2433 has recently been amended by Pub. L. No. 109-163, § 802 (Jan. 6, 2006) and Pub. L. No. 109-364, § 213 (a) (Oct. 17, 2006). The law now also includes cost growth thresholds from the program's original baseline.

[11] 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.

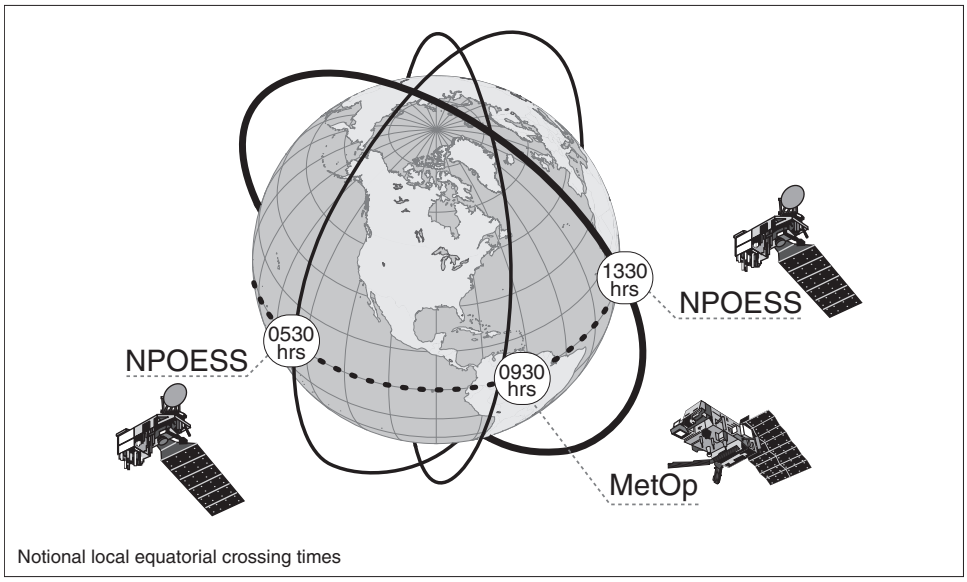
configuration of the planned polar-operational satellite program in the future.

Table 2: 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—2020	1995—2026
Estimated life cycle cost	$8.4 billion	$12.5 billion
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 EDRs	55	39 (6 are to be degraded products)

Source: GAO analysis of NPOESS program office data.

Figure 5: Nunn-McCurdy Certified Satellite Constellation



Sources: GAO analysis of NPOESS program office data; MapArt (globe).

While the Nunn-McCurdy certification decision decreased the number of NPOESS sensors and reduced the functionality of others, it allowed for the reintegration of the canceled sensors if other parties choose to fund them. Table 3 describes the changes to NPOESS instruments.

Table 3: Changes to NPOESS Instruments, as of June 2006

Instrument	Status of instrument after Nunn-McCurdy decision
Advanced technology microwave sounder	Sensor unchanged; to be included on NPP and on afternoon satellites
Aerosol polarimetry sensor	Sensor was canceled[a]
Conical-scanned microwave imager/sounder	Sensor was canceled; program office to procure a less complex microwave imager/sounder for inclusion beginning on the second NPOESS satellite
Cross-track infrared sounder	Sensor unchanged; to be included on NPP and on afternoon satellites
Data collection system	No change; subsystem is to be included on all four NPOESS satellites
Earth radiation budget sensor	Sensor was canceled; is to be replaced by a legacy sensor on C1 only[a]
Ozone mapper/profiler suite	One part of the sensor (limb) was canceled; remaining part is to be included on NPP and on all four NPOESS satellites[a]
Radar altimeter	Sensor was canceled
Search and rescue satellite aided tracking system	Sensor unchanged; subsystem is to be included on all four NPOESS satellites
Space environmental sensor suite	Sensor was canceled; is to be replaced by a less capable, less expensive legacy sensor[a]

Instrument	Status of instrument after Nunn-McCurdy decision
Survivability sensor	Subsystem was canceled[a]
Total solar irradiance sensor	Sensor was canceled[a]
Visible/infrared imager radiometer suite	Sensor unchanged; sensor is to be included on NPP and on all four NPOESS satellites

Source: GAO analysis of NPOESS program office data.

[a]While direct program funding for these sensors was eliminated, these sensors could be reintegrated should other parties choose to fund them. The Nunn-McCurdy decision notes that the spacecraft is to include space for these sensors and funds to integrate them.

The changes in NPOESS sensors affected the number and quality of the resulting weather and environmental products, called EDRs. 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 has significantly less capability for providing global climate measures than was originally planned. Specifically, the number of EDRs was decreased from 55 to 39, of which 6 are of a reduced quality. The 39 EDRs that remain include cloud base height, land surface temperature, precipitation type and rate, and sea surface winds. The 16 EDRs 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 EDRs that are of a reduced quality include ozone profile, soil moisture, and multiple products depicting energy in the space environment.

Selected Climate Sensors Have Been Added Back to the Program

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 a replacement for the Earth radiation budget sensor (called 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 solar irradiance sensor on the C1 satellite. Table 4 shows which instruments are currently planned for NPP and the four satellites of the NPOESS program, called C1, C2, C3, and C4. Program officials acknowledged that these configurations could change if other parties decide to develop the sensors that were canceled.

Table 4: Configuration of Instruments Planned for NPP and NPOESS Satellites, as of May 2008

Instrument	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 (replacing the canceled Conical-scanned microwave imager/sounder)	—	—	X	X	X
Cross-track infrared sounder	X	X	O	X	O
Data collection system	—	X	X	X	X
Clouds' and the earth's radiant energy system sensor (replacing selected capabilities of the Earth radiation budget sensor)	X	X	—	—	—
Ozone mapper/profiler suite (nadir)	X	X	—	X	—
Ozone mapper/profiler suite (limb)	X	O	—	O	—
Search and rescue satellite aided tracking system	—	X	X	X	X
Space environment monitor (replacing selected capabilities of the space environmental sensor suite)	—	X	—	X	—
Total solar irradiance sensor	—	X	O	—	O
Visible/infrared imager radiometer suite	X	X	X	X	X

Key:

X = Sensor is currently planned for this satellite

O = Canceled but could be restored to this satellite

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

Source: GAO analysis of NPOESS program office data.

NPOESS Experienced Schedule Delays and Cost Growth after It Was Restructured

After the program was restructured, NPOESS continued to experience schedule delays and cost growth. In June 2008, we reported that poor workmanship and testing delays caused an additional 8-month slip to the expected delivery date of the Visible/infrared imager radiometer suite (VIIRS) sensor.[12] This late delivery caused a corresponding delay in the expected launch date of the NPP demonstration satellite, moving it to June 2010. In addition, we reported that the program 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. Program officials subsequently modified their life cycle cost estimate to $13.95 billion, which included about

[12] GAO-08-899T.

$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.

Prior Reports Recommended Steps to Mitigate Program Risks

In recent years, we have made a series of recommendations to mitigate risks on the NPOESS program. In April 2007, we reported that the program lacked a process and plan for identifying and filling key staffing shortages and that DOD's plans to reassign the Program Executive Officer would unnecessarily increase risks to an already risky program.[13] 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 changes remained to be completed. Specifically, the program had made progress in drafting key acquisition documents, including the system engineering plan, the test and evaluation master plan, and the memorandum of agreement between the agencies. However, executive approval of those 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 NPOESS program officials develop and implement a written process for identifying and addressing human capital needs and establish a plan to immediately fill needed positions; 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.

Following up on these recommendations, in May 2008, we reported that program officials had documented the program's staffing process and made progress in filling selected budgeting and system engineering vacancies.[14] DOD, however, reassigned the Program Executive Officer in July 2007 and replaced this person with a new Program Executive Officer. We also reported that executive approval of key acquisition documents was more than a year late at that time and reiterated our prior recommendation that the agencies immediately complete these activities. The last of these acquisition documents was approved in December 2008.

[13] GAO-07-498.

[14] GAO-08-518.

Progress Made, but Continued Instrument Problems Are Driving Costs Upward, Forcing Launch Delays, and Endangering Satellite Continuity

Over the past year, selected components of the NPOESS program—including the ground segment and selected sensors—have made progress. However, the program's approved cost and schedule baseline is not achievable, and problems with two critical sensors continue to drive the program's cost and schedule. Costs are expected to grow by about $1 billion from the current $13.95 billion cost estimate, and the schedules for NPP and the first two NPOESS satellites are expected to be delayed by 7, 14, and 5 months, respectively. These delays endanger the continuity of weather and climate satellite data because there will not be a satellite available as backup should a satellite fail on launch or in orbit. Program officials reported that they are assessing alternatives for mitigating risks, and that they plan to propose a new cost and schedule baseline by June 2009.

Program Made Progress on Selected Components

With over $4 billion expended on the program through the end of fiscal year 2008, the program is well under way. Over the past year, selected components of the NPOESS program have made progress. Specifically, three of the five instruments slated for NPP have been delivered and integrated on the spacecraft; the ground-based satellite data processing system has been installed and tested at both of the locations that are to receive NPP data; and the satellites' command, control, and communications system has passed acceptance testing. Details on the status of key components are provided in table 5.

Table 5: Status and Risk Level of Key Space and Ground Components, as of April 2009

Component	Program-identified risk level	Status
Advanced technology microwave sounder	Low	For NPP: The instrument was integrated on the spacecraft in December 2006 and is awaiting delivery of the other sensors in order to complete integration testing. For C1: The instrument is currently being built by the prime contractor. Although the effort is low risk, the effort is taking more time than originally expected.
Clouds' and the earth's radiant energy system	Low	For NPP: The instrument was integrated on the spacecraft in November 2008. For C1: The instrument is on track and expected to go through systems requirements review in April 2009.
Cross-track infrared sounder (CrIS)	High	For NPP: The instrument has experienced several issues during testing and final review, including a faulty calibration target and overstressed semiconductors. Repairing these issues delayed the instrument's delivery to the NPP integration contractor. That date is now set for July 2009.
	Medium	For C1: A new calibration target will be needed for the second flight unit. A simplified design has been chosen that is based on existing technology. In addition, because the program needs to delay activities on the second flight unit in 2009, delivery of the unit could be delayed by a full year.

Component	Program-identified risk level	Status
Microwave imager/sounder	Low	For C2: The NPOESS Executive Committee recently directed the program to review the sensor's requirements in order to mitigate growing program costs. Because the sensor is not yet in development, the executive committee noted that this is an appropriate time to consider developing a less complex sensor. The program director stated that he expects the sensor to undergo a requirements review by the end of May 2009.
Ozone mapper/profiler suite	Medium	For NPP: The instrument was recently integrated on the spacecraft. However, the program office raised concerns that screws had been overtorqued and is reviewing the assembly of the instrument.
	Low	For C1: In order to fund problems on VIIRS, work was halted on the second flight unit—which will lead to a delayed delivery of approximately 1 year.
Total solar irradiance sensor	Low	For C1: Due to a lack of available funds prior to April 2009, the program office is reassessing the schedule for the first flight unit of this instrument. The preliminary design review is currently scheduled for April 2009.
Visible/infrared imager radiometer suite (VIIRS)	High	For NPP: The sensor has completed electromagnetic compatibility and vibration testing, and it began thermal vacuum testing in early May 2009. However, continued slow test execution and problems during environmental testing have led to further delays in delivering it to the NPP integration contractor. While the contractor's current plan shows delivery in September 2009, the government estimates a delivery by December 2009. For C1: More than 80 percent of the parts for the second VIIRS sensor have already been acquired.
Spacecraft	Low	For NPP: The spacecraft has been completed and three of five instruments have been integrated on it.
	Medium	For C1: The spacecraft recently completed a critical design audit; however, it is also on the "critical path" for C1, which means that any delays in the spacecraft could delay the launch date.
Command, Control, and Communications	Low	The command, control, and communications segment is being developed in a series of builds. For NPP: Build 1.4 has been completed. For C1: Build 2.1 is under development.
Integrated Data Processing System	Low	For NPP: Hardware has been deployed to two central data processing centers (NOAA's National Satellite Operations Facility in Suitland, Maryland and the Air Force Weather Agency) and testing has begun. Development continues on the next system software build.
Ground stations for receiving satellite data	Low	NOAA is working with domestic and foreign authorities to obtain approval to operate ground stations to receive satellite data. To date, the program office has reached agreement with 7 of 15 ground station sites. According to agency officials, only 3 ground stations will be operational by the launch of the first NPOESS satellite and the full complement of ground stations will be operational by the launch of the second NPOESS satellite.

Source: GAO analysis of NPOESS program office data.

Technical Challenges Cause Cost Increases, Delay Schedule, and Risk Data Continuity; Key Decisions on Program's Next Steps Are Pending

While the program has made progress, problems with two critical sensors continue to drive the program's cost and schedule. Specifically, ongoing challenges with VIIRS development, design, and workmanship have led to additional cost overruns and delayed the instrument's delivery to NPP. In addition, problems discovered during environmental testing on CrIS led the contractor to further delay its delivery to NPP and added further unanticipated costs to the program. To address these issues, the program office halted or delayed activities on other components (including the development of a sensor planned for the C1 satellite) and redirected those funds to fixing VIIRS and CrIS. As a result, those other activities now face cost increases and schedule delays.

Program officials acknowledge that NPOESS will cost more than the $13.95 billion previously estimated, but they have not yet adopted a new cost estimate. Program officials estimated that program costs will grow by about $370 million due to recent technical issues experienced on the sensors and the costs associated with halting and then restarting work on other components of the program. In addition, the costs associated with adding new information security requirements to the program could reach $200 million.[15] This estimate also does not include approximately $410 million for operations and support costs for the last two years of the program's life cycle (2025 and 2026). Thus, we anticipate that the overall cost of the program could grow by about $1 billion from the current $13.95 billion estimate—especially given the fact that difficult integration and testing of the sensors on the NPP and C1 spacecrafts has not yet occurred.[16] Program officials reported that they plan to revise the program's cost estimate over the next few weeks and to submit it for executive-level approval in June 2009.

As for the program's schedule, program officials estimate that the delivery of VIIRS to the NPP contractor will be delayed, resulting in a further delay in the launch of the NPP satellite to January 2011, a year later than the date estimated during the program restructuring—and seven months later than the June 2010 date that was established last year. In addition, program officials estimated that the first and second NPOESS satellites

[15]These estimates are subject to further refinement because the Executive Committee has not agreed on a cost estimating methodology and the agencies have not yet agreed to new information security requirements.

[16]This cost estimate includes launch vehicle costs of approximately $329 million, which are funded outside the program's baseline.

would be delayed by 14 and 5 months, respectively, because selected development activities were halted or slowed to address VIIRS and CrIS problems. The program's current plans are to launch C1 in March 2014 and C2 in May 2016. Program officials notified the Executive Committee and DOD's acquisition authority of the schedule delays, and under DOD acquisition rules, are required to submit a new schedule baseline by June 2009. See table 6 for changes in key program milestones over time.

Table 6: Changes in Key Program Milestones over Time

Milestones	As of the August 2002 contract award	As of the June 2006 certification decision	Current program estimates (as of April 2009)	Change from 2006 certification decision
Final POES launch[a]	March 2008	February 2009	February 2009 (actual)	Not applicable
NPP launch	May 2006	January 2010[b]	January 2011	1-year delay
First NPOESS satellite planned for launch	April 2009	January 2013	March 2014	14-month delay
Final DMSP launch[a]	October 2009	April 2012	May 2014[c]	25-month delay
Second NPOESS satellite planned for launch	June 2011	January 2016	May 2016	5-month delay[d]

Source: GAO analysis of DOD, NOAA, and NPOESS program office data.

[a]POES and DMSP are not part of the NPOESS program. Their launch dates are provided to indicate the increased risk of satellite data gaps between when these systems launch and when the NPOESS satellites launch.

[b]In February 2008, the launch date for NPP was delayed to June 2010.

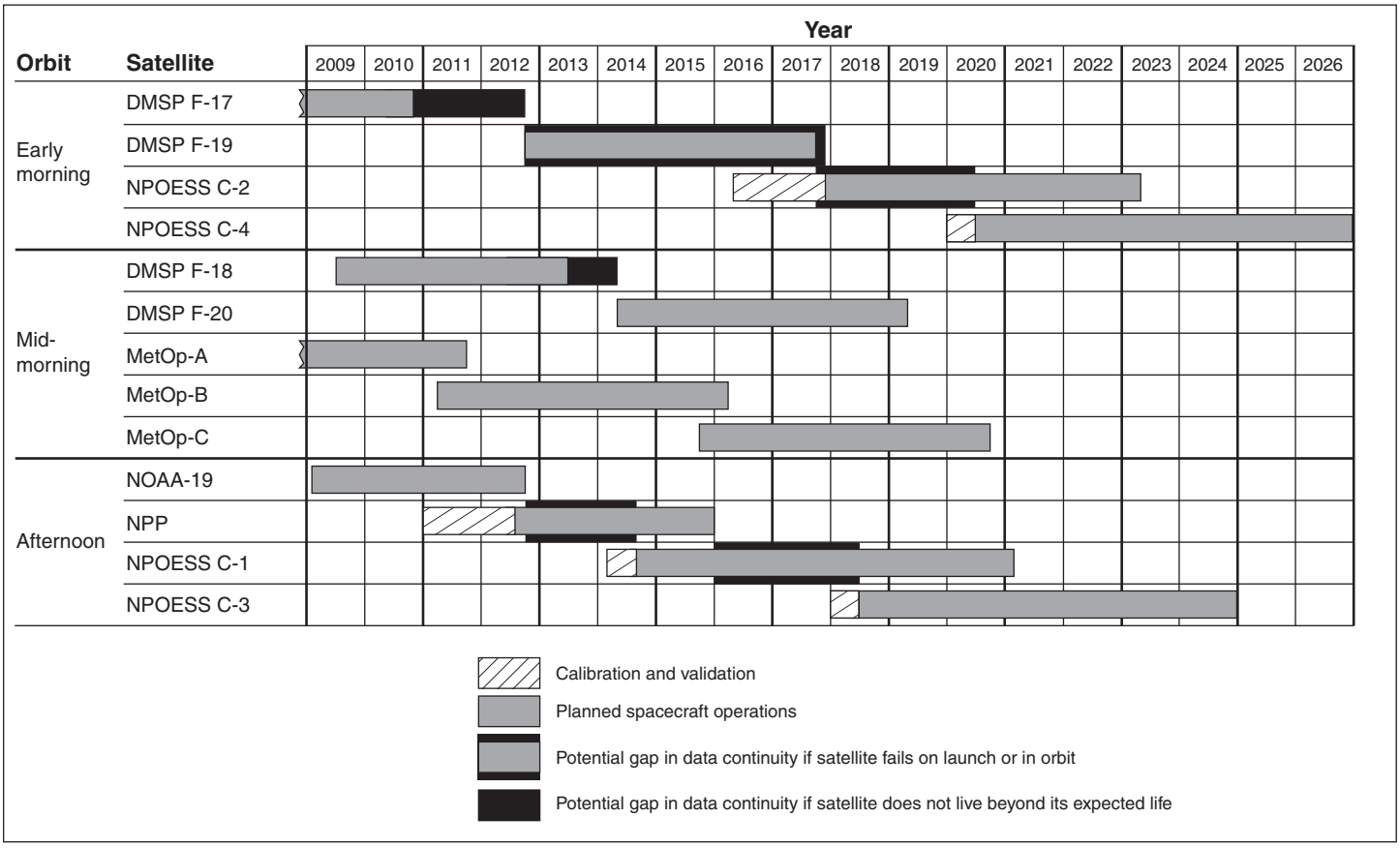
[c]DMSP program staff noted that the DMSP launches were delayed due to the health of existing satellites and to mitigate the impact of NPOESS delays. The final DMSP could be delayed to as late as 2018, if required.

[d]This 5-month delay extends from the first day of January 2016 to the last day of May 2016.

These launch delays have endangered our nation's ability to ensure the continuity of polar-orbiting satellite data. The final POES satellite, called NOAA-19, is in an afternoon orbit and is expected to have a 5-year lifespan. Both NPP and C1 are planned to support the afternoon orbit. Should the NOAA-19 satellite fail before NPP is launched, calibrated, and operational, there would be a gap in satellite data in that orbit. Further, the delays in C1 mean that NPP will not be the research and risk reduction satellite it was originally intended to be. Instead, it will have to function as an operational satellite until C1 is in orbit and operational—and if C1 fails on launch or in early operations, NPP will be needed to function until C3 is available, currently planned for 2018. The delay in the C2 satellite launch affects the early morning orbit. There are three more DMSP satellites to be launched in the early and midmorning orbits. DOD is revisiting the launch schedules for these satellites to try to extend them as long as possible. An independent review team, established to assess key program risks,

recently reported that the constellation of satellites is extremely fragile and that a single launch failure of DMSP or of the NPP satellite could result in a gap in satellite coverage from 3 to 5 years. Figure 6 shows the current and planned satellites and highlights gaps where the constellation is at risk.

Figure 6: Potential Gaps in the Continuity of Current and Planned Polar Satellites



Sources: GAO analysis of DOD, NOAA, and NPOESS program office data.

Although the program's approved cost and schedule baseline is not achievable and the polar satellite constellation is at risk, the Executive Committee has not yet made a decision on how to proceed with the program. Specifically, the Committee has not approved a new program schedule and a realistic cost estimate or determined whether it will mitigate or accept the risk of a potential gap in satellite continuity. Program officials plan to propose new cost and schedule baselines in June 2009. However, the Executive Committee does not have an estimate for

when it will make critical decisions on cost, schedule, and risk mitigation. Program officials reported that they are addressing immediate funding constraints by deferring selected activities to later fiscal years in order to pay for VIIRS and CrIS problems, delaying the launches of NPP, C1, and C2, and assessing alternatives for mitigating the risk that VIIRS will continue to experience problems—including the possibility of purchasing a legacy imaging sensor to replace VIIRS on C1. Without an executive-level decision to do so, the program is proceeding on a course that is deferring cost growth, delaying launches, and risking its underlying mission of providing operational weather continuity to the civil and military communities.

Executive Committee Has Not Effectively Fulfilled Its Responsibilities

While the NPOESS Executive Committee has made improvements over the last several years in response to prior recommendations, it has not effectively fulfilled its responsibilities and does not have the membership and leadership it needs to effectively or efficiently oversee and direct the NPOESS program. Specifically, the DOD Executive Committee member with acquisition authority does not attend committee meetings—and sometimes contradicts the Committee's decisions, the Committee does not aggressively manage risks, and many of the Committee's decisions do not achieve desired outcomes. Independent reviewers, as well as program officials, explained that the tri-agency structure of the program makes it very difficult to effectively manage the program. Until these shortfalls are addressed, the Committee is unable to effectively oversee the NPOESS program—and important issues involving cost growth, schedule delays, and satellite continuity will likely remain unresolved.

Executive Committee Has Responded to Past Recommendations

In November 2005, we reported that the Executive Committee did not meet on a regular basis and that most of its meetings did not result in major decisions, but instead triggered further analysis and review.[17] In addition, in May 2006, the Department of Commerce's Inspector General reported that the Committee did not effectively challenge the program's optimistic assessments and recommended that it provide more vigilant oversight. Since then, the Committee has met regularly on a quarterly basis and held interim teleconferences as needed.

[17] GAO-06-249T.

The Committee has also sought and reacted to advice from external advisors by, among other actions, authorizing a government program manager to reside onsite at the VIIRS contractor's facility to improve oversight of the sensor's development on a day-to-day basis. More recently, the Executive Committee sponsored a broad-based independent review of the NPOESS program and is beginning to respond to its recommendations. The independent review team's findings and recommendations are provided in appendix II.

Key Acquisition Executive Does Not Attend Executive Committee Meetings

As established by the 1995 and 2008 memorandums of agreement signed by all three agencies, the members of the NPOESS Executive Committee are (1) the Under Secretary of Commerce for Oceans and Atmosphere; (2) the Under Secretary of Defense for Acquisition, Technology, and Logistics; and (3) the NASA Administrator.[18] Because DOD has the lead responsibility for the NPOESS acquisition, the Under Secretary of Defense for Acquisition, Technology, and Logistics, was also designated as the milestone decision authority—the individual with the authority to approve a major acquisition program's progression in the acquisition process, as well as any changes to the cost, schedule, and functionality of the acquisition.[19] The intent of the tri-agency memorandums was that acquisition decisions would be agreed to by the Executive Committee before a final acquisition decision is made by the milestone decision authority.[20]

However, DOD's acquisition authority has never attended an Executive Committee meeting. This individual delegated the responsibility for attending the meetings—but not the authority to make acquisition decisions—to the Under Secretary of the Air Force. Therefore, none of the individuals who attend the Executive Committee meetings for the three

[18]The 1995 agreement specified that the NASA member would be the Deputy Administrator. Responsibility was subsequently taken over by the Administrator of NASA.

[19]According to DOD, the milestone decision authority is the designated individual who has overall responsibility for an investment. This person has the authority to approve a major acquisition program's progression in the acquisition process and is responsible for reporting cost, schedule, and performance results.

[20]The 1995 and 2008 memorandums of agreement differ slightly in this regard. The first agreement stated that DOD's milestone decision authority will make acquisition decisions with concurrence of the other Executive Committee members while the second agreement states that the DOD authority must consider committee decisions. The second agreement takes precedence in the case of a conflict.

agencies have the authority to approve the acquisition program baseline or major changes to the baseline. As a result, agreements between committee members have been overturned by the acquisition authority, leading to significant delays. For example, the details of the program's acquisition program baseline were agreed to by members of the Executive Committee, but were overruled by the office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. This required several months of extensive renegotiation. In addition, after the Executive Committee members agreed to a revised tri-agency memorandum of agreement and it was signed by the Secretary of Commerce and the Administrator of NASA, the Under Secretary of Acquisition, Technology, and Logistics refused to approve the document, and it took over a year to finalize it. Crucially, this year-long disagreement focused on whether the Under Secretary should consult with or coordinate with members of the Executive Committee on matters related to NPOESS. In August 2008, the Under Secretary of Commerce for Oceans and Atmosphere wrote to the Under Secretary of Defense for Acquisition, Technology, and Logistics, expressing concern that DOD did not recognize the management role of the tri-agency NPOESS Executive Committee or its responsibility, authority, and accountability to make decisions that represent the respective agency positions.

At the conclusion of our review, DOD agency officials stated that the absence of the Under Secretary of Defense for Acquisition, Technology, and Logistics at Executive Committee meetings is not the root cause of the Executive Committee's problems, but acknowledged that this individual's presence at the meetings could be helpful in streamlining the flow of information and the decision-making process.

Committee Does Not Aggressively Manage Risks

Best practices note that oversight of large investments is a critical part of the investment life cycle and call for oversight boards to take corrective actions at the first sign of cost, schedule, and performance problems. They also call for oversight boards to ensure that corrective actions and related efforts are executed by the project management team and tracked until the desired outcomes occur.[21] To provide this oversight, the Executive Committee holds quarterly meetings during which the program's progress is reviewed using metrics that provide an early warning of cost, schedule, and technical risks.

[21] GAO-04-394G.

Although the Executive Committee meets quarterly to review program progress and risks, and the results of those meetings are recorded in meeting minutes, the Committee does not routinely document action items or track those items to closure. Specifically, in the four meetings held between March 2007 and January 2008, the Committee explicitly documented 12 action items, but did not explicitly document action items in the three meetings from May to December 2008. Instead, 5 actions were implied in the text of the meeting minutes and at least 1 action item to proceed with a modified schedule for VIIRS was not recorded at all. Further, the Executive Committee did not routinely track the closure of its action items. Some action items were not discussed in later meetings and in cases where an item was discussed, it was not always clear what action was taken, whether it was effective, and whether the item was closed. Specifically, of the 18 action items we identified between March 2007 and December 2008, 7 were clearly closed and 11 were not.[22] For example, in May 2008, the Executive Committee asked DOD's Cost Analysis Improvement Group and the program office to reconcile their cost estimates, but it is not clear from the meetings that took place after this one whether this action was taken and what the result was. Also in May 2008, the Committee directed the prime contractor and others to investigate the root causes of technical issues; again, it is not clear whether this was completed or what the results were.

According to the Program Executive Officer, the closing of an action item is not always explicitly tracked because it typically involves gathering information that is presented during later Committee meetings. Nonetheless, by not rigorously documenting action items—including identifying the party responsible for the action, the desired outcome, and the time frame for completion—and then tracking the action items to closure, the Executive Committee is not able to ensure that its actions have achieved their intended results and to determine whether additional changes or modifications are still needed. This impedes the Committee's ability to effectively oversee the program, direct risk mitigation activities, and obtain feedback on the results of its actions.

[22]The program subsequently reported that 12 of the 18 action items have been closed and that 6 are in progress.

Committee Decisions Do Not Achieve Desired Outcomes

Best practices in investment management call for oversight of large investments throughout their life cycles.[23] Government guidance calls for oversight boards to take corrective actions at the first sign of cost, schedule, and performance slippages in order to mitigate risks and achieve successful outcomes. The NPOESS Executive Committee generally took immediate action to mitigate the risks that were brought before them; however, a majority of these actions were not effective—that is, they did not fully resolve the underlying issues or result in a successful outcome. Specifically, of 22 significant risks forwarded to the Executive Committee between January and December 2008, the Committee took some action to mitigate 17 of the risks and decided to monitor the other 5 risks. Committee actions included approving modifications to the VIIRS schedule and directing the program to modify key acquisition documents to resolve disagreements, to establish an onsite government manager at a subcontractor's facility, and to develop a plan for the way forward for the program once it was determined that the program could not execute its baseline on time within its budget.

However, the Committee's actions either did not result in successful outcomes or were inefficient in achieving successful outcomes. Of the 22 risks presented to the Executive Committee, 18 involved cost, schedule, and technical issues on the VIIRS and CrIS sensors, and 4 involved barriers to gaining approval of key acquisition documents. The Committee's actions on the sensor development risks accomplished interim successes by improving the government's oversight of a subcontractor's activities and guiding next steps in addressing technical issues—but even with committee actions, the sensors' performance has continued to falter and affect the rest of the program. Independent reviewers reported that the tri-agency structure of the program complicated the resolution of sensor risks because any decision could be revisited by another agency. In addition, while the government's onsite program manager is responsible for managing deliverables of a critical sensor, this individual reported that the plurality of customers with different expectations and priorities made it difficult to move the sensor development effort forward.

As for the 4 risks involving barriers to gaining approval of key acquisition documents, by the end of 2008, all of the acquisition documents had been completed. However, the path to achieving this successful outcome was inefficient. For example, it took over 2 years and countless iterations by

[23] GAO-04-394G.

multiple levels of management in three different agencies to complete the tri-agency memorandum of agreement. The leader of an independent review team charged with reviewing key program risks recently reported that the Executive Committee is "at best… inefficient." Program officials explained that interagency disagreements and differing priorities make it difficult to effectively resolve issues. In addition, two independent advisors noted that the tri-agency aspect of the program makes it difficult to make decisions that balance the needs of all three agencies.

The Committee's inability to make effective and efficient decisions is further complicated when difficult risks are not escalated in a timely manner. While most risks are raised to the Committee within months of the time they surface at the program level, selected interagency issues lingered before being brought before the Executive Committee. Specifically, an interagency disagreement regarding the appropriate level of security requirements was discussed and studied for 2 years before the Committee was notified—and the Committee still has not been asked to make a decision on this issue.

At the conclusion of our review, DOD officials reported that part of the problem in escalating risks is that, in violation of interagency agreements and inconsistent with DOD acquisition policy, two senior NOAA officials review and limit what the Program Executive Officer provides to the Executive Committee.[24] NOAA officials and the Program Executive Officer strongly disagreed with this statement. NASA officials commented that NOAA's enhanced oversight provides a healthy set of checks and balances to the program.

[24]DOD directive 5000.55 section E2.1.43 states that a Program Executive Officer only reports to and receives guidance and direction from the DOD component acquisition executive. Also, the 2008 tri-agency memorandum of agreement reiterates that the Program Executive Officer reports directly to and takes direction from the Executive Committee.

Program Has Assessed Alternatives, but Has Not Yet Identified a Viable Alternative for Acquiring the Last Two NPOESS Satellites

When NPOESS was restructured in June 2006, the program included two satellites (C1 and C2) and an option to have the prime contractor produce the next two satellites (C3 and C4). In approving the restructured program, DOD's decision authority noted that he reserved the right to use a different satellite integrator for the final two satellites, and that a decision on whether to exercise the option was to be made in June 2010. To prepare for this decision, DOD required a tri-agency assessment of alternative management strategies. This assessment was to examine the feasibility of an alternative satellite integrator, to estimate the cost and schedule implications of moving to an alternative integrator, and within one year, to provide a viable alternative to the NPOESS Executive Committee.

To address DOD's requirement, the NPOESS Program Executive Officer sponsored two successive alternative management studies; however, neither of the studies identified a viable alternative to the existing satellite integrator. The first study, conducted in 2007, identified three alternatives to the existing satellite integrator, including (1) re-competing the entire prime contract, (2) obtaining an independent system integrator while having the existing prime contractor continue to develop space and ground components, and (3) having the government take over responsibility for the system integration. The study identified the relative strengths and weaknesses of the alternatives and recommended that the program remain with the existing prime contractor for C3 and C4 because doing otherwise would increase cost and schedule risks. It did not quantify these costs or risks. The second alternative management study, conducted in 2008, identified the same alternatives to the current system integrator and assessed their relative cost, schedule, and performance risks to the program. The study determined that the alternatives to the system integrator were not viable options because of their potential costs, and because the prime contractor's performance had been meeting requirements. This study also recommended staying with the prime contractor for C3 and C4. Both of these studies also assessed other aspects of program management—including the government's executive and program management and the contractors' management—and made recommendations to improve them.

The Program Executive Officer plans to conduct a final assessment of alternatives prior to the June 2010 decision on whether to exercise the option to have the current system integrator produce the next two NPOESS satellites. Program officials explained that the program's evolving costs, schedules, and risks could mean that an alternative that was not viable in the past would become viable. For example, if the prime contractor's performance no longer meets basic requirements, an

alternative that was previously too costly to be considered viable might become so.

Conclusions

Continued problems in the development of critical NPOESS sensors have contributed to growing costs and schedule delays. Costs are now expected to grow by as much as $1 billion over the prior life cycle cost estimate of $13.95 billion, and problems in delivering key sensors have led to delays in launching NPP and the first two NPOESS satellites—by a year or more for NPP and the first NPOESS satellite. These launch delays have endangered our nation's ability to ensure the continuity of polar-orbiting satellite data. Specifically, if any planned satellites fail on launch or in orbit, there would be a gap in satellite data until the next NPOESS satellite is launched and operational—a gap that could last for 3 to 5 years.

The NPOESS Executive Committee responsible for making cost and schedule decisions and addressing the many and continuing risks facing the program has not yet made important decisions on program costs, schedules, and risks—or identified when it will do so. In addition, the Committee has not been effective or efficient in carrying out its oversight responsibilities. Specifically, the individual with the authority to make acquisition decisions does not attend committee meetings; corrective actions are not identified in terms of desired outcomes, resources, and time frames for completion; these actions are not tracked to closure; and selected risks are not escalated in a timely manner. Until the Committee's shortfalls are addressed, important decisions may not be effective and issues involving cost increases, schedule delays, and satellite continuity may remain unresolved.

Recommendations for Executive Action

To improve the timeliness and effectiveness of acquisition decision-making on the NPOESS program, we recommend that the Secretary of Defense direct the Under Secretary of Defense for Acquisition, Technology, and Logistics to attend and participate in NPOESS Executive Committee meetings.

We also recommend that the Secretaries of Defense and Commerce and the Administrator of NASA direct the NPOESS Executive Committee to take the following five actions:

- establish a realistic time frame for revising the program's cost and schedule baselines;
- develop plans to mitigate the risk of gaps in satellite continuity;
- track the Committee's action items from inception to closure;
- improve the Committee's ability to achieve successful outcomes by identifying the desired outcome associated with each of the Committee's actions, as well as time frames and responsible parties, when new action items are established; and
- improve the Committee's efficiency by establishing time frames for escalating risks to the Committee for action so that they do not linger unresolved at the program executive level.

Agency Comments and Our Evaluation

We received written comments on a draft of this report from the Secretary of Commerce (see app. III), the Deputy Assistant Secretary of Defense (see app. IV), and the Associate Deputy Administrator of NASA (see app. V). In their comments, NASA and NOAA agreed with our findings and recommendations and identified plans to implement them. For example, NASA noted that it would work closely with DOD and NOAA to ensure that a realistic time frame was established for cost and schedule baselines and to develop plans to mitigate program risks. NOAA noted that it planned to mitigate risk, in part by accelerating the development of environmental products—and planned to use more data from NPP than it had originally planned. Regarding our recommendations to track Executive Committee actions and ensure successful outcomes by identifying the desired outcome associated with each action as well as time frames and responsible parties, both NASA and NOAA noted that they would work with the Program Executive Officer to ensure that these actions happen in a timely and effective manner. Finally, regarding our recommendation to improve the Executive Committee's efficiency by establishing time frames for escalating risks to the Committee, both NASA and NOAA noted that they would work with the Program Executive Officer to ensure that this was done. NOAA also provided technical comments on the report, which we incorporated as appropriate.

In its written comments, DOD concurred with one and partially concurred with our other recommendations. Regarding our recommendation to have the appropriate official attend Executive Committee meetings, the agency partially concurred and noted that the Under Secretary of Acquisition,

Technology, and Logistics would evaluate the necessity of attending future Executive Committee meetings. DOD also reiterated that the Under Secretary of the Air Force was delegated the authority to attend the meetings. While we acknowledge that the Under Secretary delegated responsibility for attending these meetings, it is an inefficient way to make decisions and achieve outcomes. In the past, agreements between Executive Committee members have been overturned by the Under Secretary, leading to significant delays in key decisions.

In addition, DOD partially concurred with our recommendations that the Executive Committee establish a realistic time frame for revising the program's cost and schedule baselines, and develop plans to mitigate the risk of data gaps. For both recommendations, DOD noted that the program office should develop the plans, which would then be reviewed by the Executive Committee. We agree that the program is responsible for revising the cost and schedule baselines and developing risk mitigation plans, and that the Executive Committee is responsible for approving these plans. However, our recommendations focused on implementing these activities. Until the Committee establishes a time frame for making decisions on the program's cost and schedule baseline and endorses risk mitigation plans, there is a continued risk that the program will encounter further delays or gaps in satellite data continuity.

DOD concurred with our recommendation that the Executive Committee track action items and noted that it will recommend that the Program Executive Officer establish a Web-based tracking system so that all agencies can review the action items and their status.

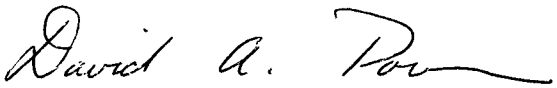
Regarding our recommendation to identify the desired outcomes, responsible parties, and time frames associated with the Committee's corrective actions, DOD partially concurred and noted that the tri-agency memorandum of agreement empowers the System Program Director and Program Executive Officer to achieve successful outcomes. While we agree that the memorandum establishes these executives' responsibilities, it is the responsibility of the Executive Committee to define expectations associated with their directed actions—including desired outcomes, who is accountable, and time frames for completion. In past Executive Committee meetings, these expectations have not been defined.

DOD partially concurred with our recommendation to establish time frames for escalating risks to the Executive Committee, and noted that the Program Executive Officer should be able to do so. However, DOD expressed concern that interference by the other agencies had weakened

the Program Executive Officer's ability to perform as intended. We acknowledge that there is a disagreement among the three agencies on the appropriate level of oversight of the program; however, we believe that one of the roles of the Executive Committee members should be to ensure that risks are escalated in a timely manner. Until time frames are established, risks may continue to linger unresolved at the program level.

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 VI.



David A. Powner
Director, Information Technology Management Issues

List of Congressional Requesters

The Honorable Brian Baird
Chairman
The Honorable Bob Inglis
Ranking Member
Subcommittee on Energy and Environment
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 Honorable F. James Sensenbrenner, Jr.
House of Representatives

Appendix I: Objectives, Scope, and Methodology

Our objectives were to (1) identify the status and risks of key National Polar-orbiting Operational Environmental Satellite System (NPOESS) program components, (2) assess the NPOESS Executive Committee's ability to fulfill its responsibilities, and (3) evaluate efforts to identify an alternative system integrator for later NPOESS satellites.

To evaluate the status and risks of key program components, we reviewed briefings and monthly program management reports. We analyzed earned value management data to assess the contractors' performance against cost and schedule estimates and evaluated reasons for variances in the contractors' performance. We obtained adequate assurance that these agency-provided data had been tested and were sufficient for our assessment purposes. 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 the Department of Defense (DOD), National Aeronautics and Space Administration (NASA), and National Oceanic and Atmospheric Administration (NOAA) and the NPOESS program office to determine the status and risks of the key program segments. We interviewed senior-level officials representing the prime contractor and the subcontractor responsible for developing a critical sensor. We also observed senior-level management review meetings to obtain information on the status of the NPOESS program.

To assess the NPOESS Executive Committee's ability to fulfill its responsibilities, we reviewed the presidential directive that established NPOESS and the 1995 and 2008 memorandums of agreement signed by all three agencies to determine the responsibilities and membership of the Executive Committee. We analyzed Executive Committee meeting minutes to determine the attendees of the meetings, the action items that were identified, and whether those action items were tracked to closure. We reviewed monthly briefings from the Program Executive Officer's Program Management Council to identify the key risks and issues facing the program. We then compared these risks and issues to the matters brought to the Executive Committee's attention in monthly letters and meeting minutes to determine whether those risks were escalated. In addition, we analyzed the Executive Committee's response to the identified risks and issues to determine whether and how the Committee responded. Finally, we interviewed senior officials in the NPOESS program office and program executive office.

To evaluate efforts to identify an alternative system integrator for later NPOESS satellites, we reviewed the Acquisition Decision Memorandum that identified the need for a study of alternatives. We reviewed briefings from two alternative management studies and analyzed the alternatives presented in those briefings. We reviewed program plans and status for addressing the recommendations of those studies. We interviewed the chair of the 2008 alternative management study and senior officials from the NPOESS program office regarding steps taken to close the studies' recommendations. We also interviewed the Program Executive Officer to understand the next steps to be taken by the program.

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 Los Angeles, California, facilities of the prime contractor, the subcontractor responsible for a critical sensor, and the Defense Contract Management Agency groups overseeing those contractors. We conducted this performance audit from October 2008 to June 2009 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: Summary of the Fall 2008 Independent Review Team's Findings and Recommendations

To address programwide risks and challenges, the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Executive Committee sponsored an independent review of the program in Fall 2008. In March 2009, the independent review team reported on its findings to the Executive Committee.[1] Its findings were that

- the program has a low probability of success in its current configuration;
- the program, as configured after the Nunn-McCurdy certification, places continuity of data at high risk because of the inability to recover from a launch or spacecraft failure;
- cost has become the most important parameter, over mission success;
- the Executive Committee is at best inefficient;
- the program office suffers from a lack of space acquisition infrastructure typically found at space acquisition centers;
- the program is making questionable decisions because of the pressure put on it by near-term budget needs;
- the highest probability of success is with the current contractor team for both NPOESS and the Visible/infrared imager radiometer suite;
- the NPOESS Preparatory Project (NPP) satellite is an operational asset;
- the priorities of the Air Force and the National Oceanic and Atmospheric Administration are not aligned; and
- the current budget is inadequate.

To address these findings, the independent review team recommended that the Committee

- address the continuity issues by defining the "right" program to meet the country's weather and climate needs;
- determine how to co-locate the program office at an acquisition center;

[1]The independent review team has provided briefings on its findings and recommendations, but as of the first week of June 2009, had not yet released its final report.

- determine an appropriate budget for the program;
- accelerate the schedule of the third and fourth NPOESS satellites;
- use NPP data operationally;
- assess whether to launch NPP on schedule or on an anticipated need date for the data;
- change the culture to put mission need first;
- stop looking at options for VIIRS and NPOESS; and
- either fund the program at an 80 percent confidence level or reduce the content of the program so that it can be funded at an 80 percent confidence instead of a 50 percent confidence level.[2]

[2]A 50 percent level of confidence indicates that a program has a 50 percent chance that the program will be delivered at the identified cost.

Appendix III: Comments from the Department of Commerce

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

June 1, 2009

Mr. David A. Powner
Director
Information Technology
Management Issues
U.S. Government Accountability Office
441 G Street, NW
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: With Costs Increasing and Data Continuity at Risk, Improvements Needed in Tri-agency Decision Making* (GAO-09-564). 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 on the Draft GAO Report Entitled
"Polar-orbiting Environmental Satellites: With Costs Increasing and Data Continuity at Risk, Improvements Needed in Tri-agency Decision-Making"
(GAO-09-564, June 2009)

General Comments

The Department of Commerce (DOC) and the National Oceanic and Atmospheric Administration (NOAA) appreciate the opportunity to review this report on the National Polar-orbiting Operational Environmental Satellite System (NPOESS) program. The Government Accountability Office (GAO) makes six recommendations that it anticipates will improve the effectiveness and efficiency of the tri-agency Executive Committee (EXCOM). The first recommendation is directed to the Secretary of Defense, while the remaining five recommendations are directed to DOC as well as to the Department of Defense (DoD) and the National Aeronautics and Space Administration (NASA). Overall, the report was fair and balanced in assessing the status and risks of key program components. DOC is committed to successfully executing the NPOESS program.

NOAA Response to GAO Recommendations

The draft GAO report states, "We are also recommending that the Secretaries of Defense and Commerce and the Administrator of NASA direct the NPOESS Executive Committee to take the following five actions:"

Recommendation 2: "Establish a realistic timeframe for revising the program's cost and schedule baselines."

NOAA Response: NOAA concurs with this recommendation. The NPOESS Integrated Program Office is developing an updated program office estimate for a revised acquisition program baseline as required by DoD acquisition regulation. However, a revised program cost and schedule estimate will be established later this year following a robust independent cost analysis of recommended programmatic and acquisition alternatives that better reflect a budget with appropriate contingency funding to reduce risk. The revised program cost and schedule estimates will be ready for initial EXCOM review in late summer 2009. The updated acquisition program baseline review process should subsequently be completed in fall 2009.

Recommendation 3: "Develop plans to mitigate the risk of gaps in satellite continuity."

NOAA Response: NOAA concurs with this recommendation. The NPOESS Preparatory Project (NPP) sensors are capable of producing data that meet or exceed the data provided by NOAA-19, our current operational satellite. Accordingly, to mitigate the potential gap in polar environmental satellite data coverage in the afternoon orbit between NOAA-19 and

1

NPOESS C1, NOAA plans to make operational use of the data from the NPP spacecraft and increase the number of products NOAA had planned to generate from the NPP system as a risk-reduction mission to minimize impacts to NOAA's National Weather Service and other users.

Specifically, NOAA will accelerate development of 54 polar legacy products. Previously, 19 legacy products were expected from NPP, with an increase to 54 products in the NPOESS C1 era. NOAA will enhance its NPP data processing ground system with sufficient infrastructure to support the additional 35 products and 24/7 operations and support.

In the mid-morning orbit, NOAA will continue through the next decade to process and deliver environmental products to its customers from the U.S. and European instruments on board the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) MetOp series of satellites.

NOAA will assess the use of additional international and interagency assets as well as potential development of spare satellites and instruments. The cost and schedule details associated with these contingency options are currently under review. Any alternative decision will ultimately be made consistent with results of the Visible/Infrared Imager/Radiometer Suite (VIIRS) instrument testing that is currently underway.

Recommendation 4: "Track the Committee's action items from inception to closure."

NOAA Response: NOAA concurs with this recommendation. NOAA will task the NPOESS Program Executive Officer (PEO) to ensure that Executive Committee (EXCOM) action items are clearly and completely defined; assigned to responsible parties for completion within a specific timeframe; and tracked to completion, including reporting the results to the EXCOM. NOAA will monitor EXCOM action items through the NOAA Program Management Council and take corrective actions needed to ensure action item coordination and closure.

Recommendation 5: "Improve the Committee's ability to achieve successful outcomes by identifying the desired outcome associated with each of the Committee actions, as well as timeframes and responsible parties, when new action items are established."

NOAA Response: NOAA concurs with this recommendation. NOAA will task the PEO to ensure EXCOM action items and desired outcomes are clearly and completely defined; assigned to responsible parties for completion within a specific timeframe; and tracked to completion, including reporting the results to the EXCOM. NOAA will monitor EXCOM action items through the NOAA Program Management Council and take corrective actions needed to ensure successful outcomes.

Recommendation 6: "Improve the Committee's efficiency by establishing timeframes for escalating risks to the Committee for action so that they do not linger unresolved at the program executive level."

NOAA Response: NOAA concurs with this recommendation. The PEO will ensure that resolution plans and schedules are established and tracked at the PEO's monthly management

2

council. NOAA will work with NASA and DoD to ensure that the PEO establishes clear criteria and timeframes for elevating risks to the EXCOM for action. NOAA will monitor PEO action items and issue resolution through the NOAA Program Management Council and the tri-agency NPOESS Oversight Council (NOC) to take corrective actions needed to ensure timeliness in addressing escalating risks.

Note: The NOC, established in the spring of 2009, is the tri-agency council that reviews the NPOESS program on a more recurrent basis than the senior-level EXCOM. The NOC, which reports to the EXCOM, is co-chaired by NOAA's Deputy Under Secretary of Commerce for Oceans and Atmosphere, the Deputy Under Secretary of the Air Force, and the Deputy Administrator of NASA. These members are responsible for representing their agencies and providing a reasonable representation of their EXCOM position to ensure that issues and actions are responded to in a timely manner.

3

Appendix IV: Comments from the Department of Defense

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
6000 DEFENSE PENTAGON
WASHINGTON, DC 20301-6000

MAY 28 2009

NETWORKS AND
INFORMATION INTEGRATION

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 Government Accountability Office (GAO) draft report, GAO-09-564, "POLAR-ORBITING ENVIRONMENTAL SATELLITES: With Costs Increasing and Data Continuity at Risk, Improvements Needed in Tri-agency Decision Making" dated May 1, 2009 (GAO Code 310890). The DoD acknowledges receipt of the DRAFT report.

Sincerely,

Dr. Ronald C. Jost
Deputy Assistant Secretary of Defense
(C3, Space and Spectrum)

Enclosure(s):
As stated

GAO DRAFT REPORT DATED MAY 1, 2009
GAO-09-564 (GAO CODE 310890)

"POLAR-ORBITING ENVIRONMENTAL SATELLITES: WITH COSTS INCREASING AND DATA CONTINUITY AT RISK, IMPROVEMENTS NEEDED IN TRI-AGENCY DECISION MAKING"

DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATIONS

RECOMMENDATION 1: The GAO recommends that the Secretary of Defense direct the Under Secretary of Defense for Acquisition, Technology and Logistics to attend and participate in National Polar-orbiting Operational Environmental Satellite System (NPOESS) Executive Committee meetings. (p. 32/GAO Draft Report)

DOD RESPONSE: Partially concur. The recently confirmed Under Secretary of Defense for Acquisition, Technology and Logistics (USD AT&L) as the Milestone Decision Authority for NPOESS, will evaluate the necessity to attend and participate in all future Executive Committee (EXCOM) meetings. The Memorandum of Agreement (MOA) between the Department of Commerce, Department of Defense, and National Aeronautics and Space Administration clearly defines the responsibilities of the EXCOM, Integrated Program Office (IPO), Program Executive Officer (PEO), and System Program Director (SPD). The Under Secretary of the Air Force attends EXCOM meetings on behalf of USD AT&L as delegated on 03 June 2002. The SecAF is the DoD lead for acquisition execution review, funding and manpower, as well as the lead service for operational weather products for the DoD.

RECOMMENDATION 2: The GAO recommends that the Secretary of Defense direct the NPOESS Executive Committee to establish a realistic timeframe for revising the program's cost and schedule baselines. (p. 32/GAO Draft Report)

DOD RESPONSE: Partially concur. Per the Memorandum of Agreement (18 Dec 2008), "*The Under Secretary of Commerce for Oceans and Atmosphere, the Under Secretary of Defense for Acquisition, Technology, and Logistics, and the NASA Administrator will form the NPOESS EXCOM. Each EXCOM member will be accountable to the EXCOM for his/her agency's support of the NPOESS program.*" The DoD EXCOM member will continue to monitor and review the NPOESS program cost and schedule updates to the baseline from the PEO quarterly.

RECOMMENDATION 3: The GAO recommends that the Secretary of Defense direct the NPOESS Executive Committee to develop plans to mitigate the risk of gaps in satellite continuity. (p. 32/GAO Draft Report)

Attachment
Page 1 of 2

DOD RESPONSE: Partially concur. The EXCOM should direct the program office to establish plans to mitigate the risk gaps in satellite continuity as indicated in this report. The EXCOM can review the program's risk mitigation plan and modify as necessary.

RECOMMENDATION 4: The GAO recommends that the Secretary of Defense direct the NPOESS Executive Committee to track the Committee's action items from inception to closure. (p. 33/GAO Draft Report)

DOD RESPONSE: Concur. To accomplish this, the DoD recommends the PEO establish a web-based tracking system such that all agencies can review action items from inception to closure.

RECOMMENDATION 5: The GAO recommends that the Secretary of Defense direct the NPOESS Executive Committee to improve the Committee's ability to achieve successful outcomes by identifying the desired outcome associated with each of the Committee actions, as well as timeframes and responsible parties, when new action items are established. (p. 33/GAO Draft Report)

DOD RESPONSE: Partially concur. The DoD believes the MOA establishes responsibilities that empower responsible individuals (e.g. PEO, SPD) to achieve successful outcomes. The MOA states, "*The SPD will direct and manage the NPOESS IPO with immediate oversight of the PEO. The SPD is ultimately responsible to the EXCOM for the conduct of the NPOESS program and will be granted the decision authority deemed necessary to execute the program. The SPD will also coordinate decisions on NPOESS matters that affect DOC, NASA, and DoD with the PEO to ensure resolution and coordination of all major decisions.*" Furthermore, the EXCOM will "*exercise oversight authority over the program through the PEO*". The DoD EXCOM member will support Committee actions and will be responsive to the PEO's recommendations.

RECOMMENDATION 6: The GAO recommends that the Secretary of Defense direct the NPOESS Executive Committee to improve the committee's efficiency by establishing timeframes for escalating risks to the Committee for action so that they do not linger unresolved at the program executive level. (p. 33/GAO Draft Report)

DOD RESPONSE: Partially concur. The DoD agrees that issues that are unresolved at the program execution level should be brought to the EXCOM and efficiently acted upon. As a DoD led acquisition, the PEO structure is in place to manage program risks. As such, the PEO has the responsibility to follow the traditional DoD streamlined acquisition supervision channels between the PEO and MDA. The object of this streamlined channel is to improve ability of MDA-PEO chain to pass clear unfiltered information up/subsequent acquisition guidance down. Impact of additional entities in PEO-MDA chain, contrary to approved MOA Amendment, has apparently weakened PEO oversight (as highlighted in the Alternative Management Structure Study of 2008).

Attachment
Page 2 of 2

Appendix V: Comments from the National Aeronautics and Space Administration

National Aeronautics and Space Administration
Office of the Administrator
Washington, DC 20546-0001

May 29, 2009

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

Dear Mr. Powner:

NASA appreciates the opportunity to comment on your draft report entitled, "Polar-orbiting Environmental Satellites: With Costs Increasing and Data Continuity at Risk, Improvements Needed in Tri-agency Decision Making," (GAO-09-564).

In the draft report, GAO makes a total of six recommendations intended to improve the timeliness and effectiveness of acquisition decision-making on the National Polar-orbiting Operational Environmental Satellite System (NPOESS) program. Below is NASA's response to the five recommendations which were addressed directly to the Agency:

Recommendations 2 and 3: (1) Establish a realistic timeframe for revising the program's cost and schedule baselines; and (2) develop plans to mitigate the risk of gaps in satellite continuity.

Response: Concur. We have been working closely with the National Oceanic and Atmospheric Administration (NOAA) and the Department of Defense (DoD) to develop a viable course of action to address both of these concerns. The NPOESS program continues to struggle with the impacts of persistent delays caused by the late deliveries of key instruments. As you know, this has significantly impacted the launch readiness date for our NPOESS Preparatory Project (NPP) Mission, causing near-term concerns about data continuity with the on-orbit Aqua Satellite. NASA has been actively supporting the tri-agency assessment efforts that are studying the possible options for a path forward for NPOESS and will continue to do so.

Recommendation 4: Track the Committee's action items from inception to closure.

Response: Concur. We agree with your recommendation that the Executive Committee (EXCOM) maintain a status of action items established during the quarterly EXCOM meetings and track these items from inception to closure. We will work with the Program Executive Officer for Environmental Satellites (PEO) to ensure that the necessary controls and processes are established.

Recommendation 5: Improve the Committee's ability to achieve successful outcomes by identifying the desired outcome associated with each of the Committee actions, as well as timeframes and responsible parties, when new action items are established.

Response: Concur. We agree with your recommendation to establish desired outcomes, timeframes, and responsible parties for the actions taken during the EXCOM meetings. Again, we will work with the PEO to ensure that the actions are fully documented and recorded in the minutes to the EXCOM meetings.

Recommendation 6: Improve the Committee's efficiency by establishing timeframes for escalating risks to the Committee for action so that they do not linger unresolved at the program executive level.

Response: Concur. We agree with your concerns and recommendation regarding unresolved program risks and the escalation of risks to the EXCOM. Although many risks can be adequately managed at the PEO or Systems Program Director (SPD) level, there are some risks that would benefit from escalation to the EXCOM level for tri-agency adjudication. We will work with the PEO to ensure that these risks are escalated to the EXCOM level when necessary.

NASA will continue to work with NOAA and the DoD toward the success of the NPP and NPOESS programs. If you have any questions or require additional information, please contact Andrew Carson at (202) 358-1702.

Thank you again for the opportunity to review this draft report, and we are looking forward to your final report to Congress.

Sincerely,

Charles H. Scales
Associate Deputy Administrator

Appendix VI: 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 M. Phillips, Assistant Director; Kate Agatone; Carol Cha; Neil Doherty; Kaelin P. Kuhn; Kathleen S. Lovett; and Lee McCracken made key contributions to this report.

GAO's Mission

The Government Accountability Office, the audit, evaluation, and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability.

Obtaining Copies of GAO Reports and Testimony

The fastest and easiest way to obtain copies of GAO documents at no cost is through GAO's Web site (www.gao.gov). Each weekday afternoon, GAO posts on its Web site newly released reports, testimony, and correspondence. To have GAO e-mail you a list of newly posted products, go to www.gao.gov and select "E-mail Updates."

Order by Phone

The price of each GAO publication reflects GAO's actual cost of production and distribution and depends on the number of pages in the publication and whether the publication is printed in color or black and white. Pricing and ordering information is posted on GAO's Web site, http://www.gao.gov/ordering.htm.

Place orders by calling (202) 512-6000, toll free (866) 801-7077, or TDD (202) 512-2537.

Orders may be paid for using American Express, Discover Card, MasterCard, Visa, check, or money order. Call for additional information.

To Report Fraud, Waste, and Abuse in Federal Programs

Contact:

Web site: www.gao.gov/fraudnet/fraudnet.htm
E-mail: fraudnet@gao.gov
Automated answering system: (800) 424-5454 or (202) 512-7470

Congressional Relations

Ralph Dawn, Managing Director, dawnr@gao.gov, (202) 512-4400
U.S. Government Accountability Office, 441 G Street NW, Room 7125
Washington, DC 20548

Public Affairs

Chuck Young, Managing Director, youngc1@gao.gov, (202) 512-4800
U.S. Government Accountability Office, 441 G Street NW, Room 7149
Washington, DC 20548

Please Print on Recycled Paper