AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

AN INSECURE FORECAST FOR CONTINUITY OF CLIMATE AND WEATHER DATA: THE NPOESS WEATHER SATELLITE PROGRAM

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

COMMITTEE ON SCIENCE AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

JUNE 19, 2008

Serial No. 110–109

Printed for the use of the Committee on Science and Technology

Available via the World Wide Web: http://www.science.house.gov

U.S. GOVERNMENT PRINTING OFFICE

43–349PS WASHINGTON : 2008

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

COMMITTEE ON SCIENCE AND TECHNOLOGY

HON. BART GORDON, Tennessee, *Chairman*

JERRY F. COSTELLO, Illinois
EDDIE BERNICE JOHNSON, Texas
LYNN C. WOOLSEY, California
MARK UDALL, Colorado
DAVID WU, Oregon
BRIAN BAIRD, Washington
BRAD MILLER, North Carolina
DANIEL LIPINSKI, Illinois
NICK LAMPSON, Texas
GABRIELLE GIFFORDS, Arizona
JERRY MCNERNEY, California
LAURA RICHARDSON, California
PAUL KANJORSKI, Pennsylvania
STEVEN R. ROTHMAN, New Jersey
JIM MATHESON, Utah
MIKE ROSS, Arkansas
BEN CHANDLER, Kentucky
RUSS CARNAHAN, Missouri
CHARLIE MELANCON, Louisiana
BARON P. HILL, Indiana
HARRY E. MITCHELL, Arizona
CHARLES A. WILSON, Ohio
ANDRÉ CARSON, Indiana

RALPH M. HALL, Texas
F. JAMES SENSENBRENNER JR., Wisconsin
LAMAR S. SMITH, Texas
DANA ROHRABACHER, California
ROSCOE G. BARTLETT, Maryland
VERNON J. EHLERS, Michigan
FRANK D. LUCAS, Oklahoma
JUDY BIGGERT, Illinois
W. TODD AKIN, Missouri
JO BONNER, Alabama
TOM FEENEY, Florida
RANDY NEUGEBAUER, Texas
BOB INGLIS, South Carolina
DAVID G. REICHERT, Washington
MICHAEL T. MCCAUL, Texas
MARIO DIAZ-BALART, Florida
PHIL GINGREY, Georgia
BRIAN P. BILBRAY, California
ADRIAN SMITH, Nebraska
PAUL C. BROUN, Georgia

SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

HON. NICK LAMPSON, Texas, *Chairman*

JERRY F. COSTELLO, Illinois
LYNN C. WOOLSEY, California
DANIEL LIPINSKI, Illinois
GABRIELLE GIFFORDS, Arizona
JERRY MCNERNEY, California
MARK UDALL, Colorado
BRIAN BAIRD, Washington
PAUL KANJORSKI, Pennsylvania
BART GORDON, Tennessee

BOB INGLIS, South Carolina
ROSCOE G. BARTLETT, Maryland
JUDY BIGGERT, Illinois
W. TODD AKIN, Missouri
RANDY NEUGEBAUER, Texas
MICHAEL T. MCCAUL, Texas
MARIO DIAZ-BALART, Florida

RALPH M. HALL, Texas

JEAN FRUCI *Democratic Staff Director*
JAMES PAUL *Democratic Professional Staff Member*
SHIMERE WILLIAMS *Democratic Professional Staff Member*
TARA ROTHSCHILD *Republican Professional Staff Member*
STACEY STEEP *Research Assistant*

CONTENTS

June 19, 2008

	Page
Witness List	2
Hearing Charter	3

Opening Statements

Statement by Representative Nick Lampson, Chairman, Subcommittee on Energy and Environment, Committee on Science and Technology, U.S. House of Representatives	8
Written Statement	9
Statement by Representative Bob Inglis, Ranking Minority Member, Subcommittee on Energy and Environment, Committee on Science and Technology, U.S. House of Representatives	9
Written Statement	10
Prepared Statement by Representative Jerry F. Costello, Member, Subcommittee on Energy and Environment, Committee on Science and Technology, U.S. House of Representatives	11

Witnesses:

Mr. David A. Powner, Director, Information Technology Management Issues, Government Accountability Office	
Oral Statement	11
Written Statement	13
Biography	27
Vice Admiral Conrad C. Lautenbacher, Jr. (U.S. Navy, Ret.), Under Secretary of Commerce for Oceans and Atmosphere; Administrator, National Oceanic and Atmospheric Administration (NOAA)	
Oral Statement	28
Written Statement	31
Biography	39
Discussion	
Executive Committee Performance	40
Continuity Concerns	41
The VIIRS Sensor	44
The Gap Between Satellite Launches	44
More on the Executive Committee's Performance	46
Acquisition Document Approval	47
Bureaucratic Delays	50
More on Acquisition Document Approval	52
Life Cycle Costs	53

Appendix 1: Answers to Post-Hearing Questions

Mr. David A. Powner, Director, Information Technology Management Issues, Government Accountability Office	58
Vice Admiral Conrad C. Lautenbacher, Jr. (U.S. Navy, Ret.), Under Secretary of Commerce for Oceans and Atmosphere; Administrator, National Oceanic and Atmospheric Administration (NOAA)	61

Page

Appendix 2: Additional Material for the Record

Memorandum for the Secretary of the Air Force from John J. Young, Jr., Under Secretary of Defense, dated April 30, 2008 70

Letter to John J. Young, Jr., Under Secretary of Defense, from Conrad C. Lautenbacher, Under Secretary of Commerce for Oceans and Atmosphere, NOAA, dated May 16, 2008 72

AN INSECURE FORECAST FOR CONTINUITY OF CLIMATE AND WEATHER DATA: THE NPOESS WEATHER SATELLITE PROGRAM

THURSDAY, JUNE 19, 2008

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:11 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Nick Lampson [Chairman of the Subcommittee] presiding.

BART GORDON, TENNESSEE
CHAIRMAN

RALPH M. HALL, TEXAS
RANKING MEMBER

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE AND TECHNOLOGY
SUITE 2320 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-6301
(202) 225-6375
TTY: (202) 226-4410
http://science.house.gov

Subcommittee on Energy and Environment

Hearing on

An Insecure Forecast for Continuity of Climate and Weather Data: The NPOESS Weather Satellite Program

Thursday, June 19, 2008
10:00a.m. – 12:00p.m.
2318 Rayburn House Office Building

Witness List

Mr. David Powner
Director, Information Technology Management Issues, Government Accountability Office

Vice Admiral Conrad C. Lautenbacher Jr.
Undersecretary for Oceans and Atmosphere and Administrator, National Oceanic and Atmospheric Administration

HEARING CHARTER

SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

An Insecure Forecast for Continuity of Climate and Weather Data: The NPOESS Weather Satellite Program

THURSDAY, JUNE 19, 2008
10:00 A.M.—12:00 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

Purpose

The Subcommittee on Energy and Environment meets on June 19, 2008, for further oversight on the National Polar-Orbiting Operational Environmental Satellite System (NPOESS). The Government Accountability Office (GAO) will testify on the latest report concerning the troubled weather satellite program and the Administrator of the National Oceanic and Atmospheric Administration (NOAA) will respond. Recent events have once more raised questions about the stability of the program, including a new threat to the most critical instrument and decisions that may create new management risks.

Witnesses

Mr. David Powner, Director, Information Technology Management Issues, Government Accountability Office

Mr. Powner is the head of the GAO team continuously monitoring the NPOESS program since 2001. He will present the latest in the continuing series of reports commissioned by the Committee on this satellite program. He will also respond to changes that have occurred in the program's status since GAO completed work on its review.

Vice Admiral (Ret.) Conrad Lautenbacher, Administrator, National Oceanic and Atmospheric Administration

The NPOESS program is fundamental to NOAA's weather missions, and Admiral Lautenbacher, as head of NOAA, shares responsibility for managing the development program. Lautenbacher serves as a member of the program Executive Committee (EXCOM) with representatives of NASA and the Air Force, NOAA's partner agencies. Because the GAO report raises issues requiring action by the EXCOM, Admiral Lautenbacher has been asked to provide NOAA's testimony.

Issues for Discussion

A. Life Cycle Cost Increases

Just over a year ago, the Subcommittee held its previous hearing on the NPOESS program. At the time, efforts were underway to implement decisions imposed on the program after a so-called Nunn-McCurdy review by the Department of Defense. The NPOESS program is being conducted using the Air Force procurement system, and at the point that the program cost estimate rose more than 25 percent beyond the approved baseline, DOD was required by law to execute a program recertification.

In June 2006, the results of this recertification were announced. In brief, the estimate for **acquisition cost rose to $11.5 billion** (with an additional $1 billion to cover operating costs, making the **total life cycle cost $12.5 billion**). Only **two satellites** were guaranteed to be built, with the **first launch scheduled for 2013.** A decision to buy **two more satellites,** and to **reconsider the program's management structure,** was to be made in **2010.** This contrasted with the previously baselined program, which anticipated purchasing **six satellites** at an **acquisition cost of $7.4 billion** with a **first launch in 2008.** The capabilities of the satellites were reduced, in that one of the major instruments (the Conical Microwave Imaging Sounder) was removed, to be replaced with a less-capable instrument on the second NPOESS satellite that would be launched in 2016. Also removed were instruments

intended to extend the data records for monitoring the Earth's climate, and to track events on the Sun that had the potential to disturb the planet's geomagnetic environment.

Mr. Powner reported to staff in a briefing June 11 that the life cycle cost for the program has apparently increased **$1.1 billion**, to **$13.6 billion.** Based on the data reviewed, he estimates that the NPOESS program expended $300 million in the last year to deal with the broken frame suffered by the Cross-Track Infrared Sounder (CrIS) during vibration testing, and to address the changes in the cryoradiator for the primary NPOESS instrument, the Visible Infrared Imaging Radiometer Suite (VIIRS). The problems with VIIRS ultimately resulted in another delay in delivery of the flight unit for the NPOESS Preparatory Project (NPP) mission,[1] which slipped the launch date to June 2010.

Beyond this, GAO believes that the program life cycle cost will grow another $800 million to reflect an updated understanding of the likely operations and support costs. The NPOESS program recently undertook a review of the operations cost estimate, the first since 2002. The DOD's independent cost estimators were also asked to prepare an estimate, which appears to be the first time an independent estimate on operations costs has been conducted. On June 12, NOAA briefed staff that the two estimates are being reconciled to determine what will be incorporated into the program baseline. They were reluctant to provide their own estimate of what that number would be.

GAO's estimate came before NOAA informed staff of yet another threat to VIIRS that is under investigation. While preparing the unit for testing, some of the screws used to assemble the instrument were found to have their heads sheared off. Initial indications are that the posts into which the screws are inserted were manufactured improperly and so the screws did not seat properly. There is a possibility that the entire VIIRS instrument may have to be disassembled to install all new posts. If this is indeed the case, NPP will once again be delayed and there will be a further cost impact. The NOAA briefers hoped this will be avoided. In either case, this is not a technical issue that results from efforts to push technology. Despite the multiple layers of oversight that have been applied to the VIIRS instrument for some years, these surprises continue to occur and the program continues to be held hostage. It is interesting to note that this backsliding has occurred in the period following the transfer of the former NPOESS Program Executive Officer, Air Force Brigadier General Susan Mashiko, against the warning in GAO's previous report. Despite the fact that she was replaced by the System Program Director, Dan Stockton, it cannot be ruled out that these changes allowed slack to creep back into the program.

B. The EXCOM relationships

GAO once again notes that major management documents have yet to be finalized and recommends that this be done as quickly as possible. The agencies received a new incentive to accomplish this goal. On April 30, 2008, the Program Acquisition Executive, Under Secretary for Defense for Acquisitions, Logistics and Technology John Young, informed the program that failure to finalize all documents by August 31, 2008 would result in a cutoff of DOD funds.[2] (see attached) Loss of DOD funding, by direction of the Committee on Appropriations, would require the Department of Commerce to cut an equal amount of funding. That would, of course, be a crippling blow to the program.

The NPOESS program is a unique entity, in that it receives its budget from two co-equal sources and is governed by an Integrated Program Office (IPO) where NOAA has program management responsibilities, the Air Force directs acquisition activities and NASA contributes technical support and manages the NPP mission. The Nunn-McCurdy recertification of NPOESS in 2006 was driven by the goal of maintaining existing levels of operational weather capability. The staff was briefed on June 18 by Josh Hartman, the staff specialist for space and intelligence matters for Mr. Young, to describe the genesis of the memorandum. In brief, he described the memorandum as an effort to instill greater discipline into the NPOESS pro-

[1] This precursor satellite, funded by NASA, was originally intended to allow NPOESS operators to practice with the major instruments before introducing them into the operational constellation. It has now taken on the additional function of carrying on climate monitoring responsibilities after the expected loss of NASA's *Aqua* satellite.

[2] Young, John. Memorandum for the Secretary of the Air Force, Joint Chiefs of Staff/J-* and Program Executive Office, Environmental Sensing. *Subject: National Polar-orbiting Operational Environmental Satellite System (NPOESS) Acquisition Decision Memorandum.* Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, Department of Defense, Washington, D.C. April 30, 2008.

gram. The continuing failure to complete agreements on the program management documents resulted in the establishment of the funding cut-off deadline of August 31, 2008. Mr. Hartman agreed with GAO that the process had consumed an excessive amount of time, and Mr. Young's direction is intended to focus minds.

Of particular interest was the discussion about the current status of these documents. In our briefing with NOAA, the message seemed to be that many documents were awaiting clearance by the Air Force. GAO seemed to have a similar view. Mr. Hartman, however, provided a chart he had received from Program Executive Officer Dan Stockton showing that decisions need to be made by NASA and NOAA as well. GAO's testimony highlighted issues relating to the new Memorandum of Agreement that is to define agency roles in the reconstituted program. There was indication that DOD was asking for changes after the other agencies had finished. Mr. Hartman agreed that DOD had not communicated effectively with its partners, but that there were statutory responsibilities for DOD that required certain language to be included and that he felt this had not been clear to NOAA and NASA.

Mr. Hartman also discussed the requirements changes for NPOESS instruments described in Young's letter. These result from a June 2006 agreement with the program user groups to prioritize schedule and cost over performance when conflicts arose among those three elements. One of the Nunn-McCurdy decisions was to allow instrument performance to fall back to a level equal to the performance of instruments on the existing satellites (DOD's Defense Meteorological Satellite Program or NOAA's Polar-Orbiting Environmental Satellites). Again, Mr. Hartman stated that the discussions underway to convert that decision into the actual numbers for inclusion in the program baseline had dragged on and needed resolution. The effect of Mr. Young's memorandum is to direct the program to continue pursuing the instrument performance levels laid out in the program specifications. Should it happen that trying to achieve those program improvements would result in schedule slips or cost increases, the EXCOM would decide when to authorize reducing the performance to so-called "legacy" level. Admiral Lautenbacher's response[3] expresses concern that the guidance is not completely clear where the performance boundaries lie and requests that this be clarified. (see attached)

GAO provided the new Decision Memorandum and NOAA's response to Committee staff on June 11. They came as something of a surprise, and an effort was made to include Mr. Young as a witness at the hearing. He declined, due to the late date. The staff's meeting with Mr. Hartman allowed some insight into Mr. Young's intentions. Mr. Hartman disagreed that DOD has been seeking to escape from its commitment and stated Mr. Young hopes that greater discipline will allow the program as we know it to be completed. Had his memorandum been provided to the Committee earlier, he might have been able to make those points directly. Admiral Lautenbacher should be asked why the Committee did not receive the memorandum from NOAA in May, leaving it to GAO to bring it to our attention only a week before the hearing.

The staff's meeting with Mr. Hartman also revived the issue of the effectiveness of the Executive Committee in managing the NPOESS program. Mr. Hartman has been participating in EXCOM meetings since he started working in Mr. Young's office last August. The EXCOM, he said, seemed to spend a great deal of time on status reports, and he often found that he left meetings wondering what had been accomplished. The languid pace of completing the management documents and executing the needed requirements changes in the program baseline reflected the difficulty the EXCOM had in reaching decisions. In the NOAA briefing, Mr. Stockton was asked directly if the funding cutoff reflected a feeling that the program need a "kick in the pants" to overcome procrastination. He said no. Yet this was precisely Mr. Hartman's explanation for the language in the memorandum.

The Executive Committee is always presented to the Committee as the final decision point for NPOESS decisions that cannot be made elsewhere. Yet Mr. Hartman's description seems to show that it has reverted to the ineffective body that earned Committee criticism during the Nunn-McCurdy process. At that time, it appeared that EXCOM members were not even aware of how far the situation had deteriorated. Mr. Hartman believes that the EXCOM can accomplish its intended function with appropriate leadership—which Mr. Young appears to be willing to supply if necessary. There may also be other alternatives the Committee should consider.

---

[3] Lautenbacher, Conrad C., Jr. Letter to the Honroable John J. Young, Jr. Office of the Under Secretary of Commerce for Oceans and Atmosphere, Department of Commerce, Washington, D.C. May 16, 2008.

C. Alternative management

The NPOES program was tasked, as part of the Nunn-McCurdy decision, to evaluate possible alternative management structures in time to determine if Northrop Grumman should be replaced as system contractor in 2010. According to GAO's report, the resulting study was completed last September. Mr. Young asked for a status report on this effort in May and directed that it be completed by August 31. Admiral Lautenbacher should be asked to discuss the possible alternatives that the program has identified, and describe the risks and benefits the program can expect. A decision to change would be made at the time that the decision to transition from engineering to production is expected. This will also entail choosing to purchase the third and fourth NPOESS satellites. That decision is somewhat foreordained, given that nothing has been put in place to develop a follow-on system. Whether to then continue buying NPOESS satellites or inaugurate a new development program should be explored.

D. Ground system security standards

GAO also highlights in its report that NOAA and the Air Force disagree on the level of security standards to be applied to the ground segment of NPOESS. The Department of Defense established the original security requirements for the ground-side elements. NOAA now believes that newer Federal Information Processing Standards should be applied. According to GAO, adopting NOAA's position would have a cost impact in the "hundreds of millions" of dollars. GAO's report indicates that the rework and retesting to implement new standards could affect the cost and schedule of what has to date been the lowest-risk part of the NPOESS program. Admiral Lautenbacher should explain why the benefits of making this late change—with its attendant risk—are worth the costs. He should also explain how such costs will be met if the decision is to go forward.

E. Climate sensor recovery

Dr. John Marburger, Director of the Office of Science and Technology Policy (OSTP), testified at last year's hearing about the process underway to recover from the loss of the climate sensors. Both NOAA and NASA had collaborated on an analysis of the threats to climate monitoring posed by the loss of these sensors aboard NPOESS. The Subcommittee was concerned that OSTP might be moving too slowly; teams developing some of the climate sensors were preparing to disband.

Since last year's hearing, decisions have been made to bring forward and refurbish the last CERES (Clouds and Earth's Radiant Energy System) sensor from the first NPOESS satellite to fly on NPP. A new CERES sensor will then be built for the first NPOESS flight. Another sensor, the Total Solar Irradiance Sensor (TSIS), was restored to the first NPOESS satellite. NOAA had requested funds to begin the CERES changes in the FY08 budget, but this was lost in the final omnibus appropriation. The agency cobbled together funds to permit steps to be taken to support an October 1, 2008 start. The agency also intends to begin the new TSIS sensor program on the same day, with delivery contemplated for December 2011.

Success at restoring the CERES and TSIS sensors now depends on NOAA's request for $74 million in its FY09 budget. This is the first installment of what is intended to be a five-year, $74 million level-of-effort program. GAO notes in its report that a plan for the long-term restoration of the Nation's climate-monitoring capability is still lacking, and that the sensors announced to date only deal with the most immediate near-term threats of gaps in climate data. NOAA indicated that the level-of-effort proposal is intended to provide that missing plan, to develop additional sensors and to place them into operation. The agency has expressed concern that the contemplated continuing resolution may upset the progress made so far.

Much still remains to be dealt with in terms of the capabilities lost from the NPOESS sensors. For example, the Aerosol Polarimetric Sensor (APS) program has now arrived at much the same spot that TSIS found itself in last year. APS will fly the prototype sensor on the upcoming *Glory* mission for NASA. A new design, it has been difficult to achieve the targets for precision and accuracy needed to meet the promised specifications and NASA has been frustrated with Raytheon's performance.[4] Recently, however, the instrument has been meeting its test goals and is on track for delivery. The contract is therefore running down and the instrument team is likely to break up. NOAA told staff that the agency intends to evaluate the performance of the sensor before deciding whether to purchase more. This is consistent with the recommendations from OSTP's analysis, but means that there will likely be no option to fly a new sensor for some years after the end of the *Glory* mission.

[4] APS is being built by the same Raytheon division responsible for the VIIRS instrument.

This will likely affect efforts to provide a more accurate understanding of the impacts atmospheric aerosols have on climate.

F. Space weather sensor recovery

The second set of sensors demanifested from NPOESS in 2006 monitor the so-called "space weather" phenomena generated in solar flares and coronal mass ejections. These events can, under the right circumstances, affect satellite communications, overwhelm signals from the Global Positioning System, increase long-term cancer risks for airline crews and pilots flying in the polar regions or bring down power grids. The Air Force is particularly concerned because of the difficulty in discerning between natural interference with satellite command and control and deliberate efforts to impede communications as prelude to an attack.

In January, the Office of the Federal Coordinator of Meteorology (OFCM) submitted its analysis of the impacts to the space weather program occasioned by the loss of the NPOESS space weather sensors to OSTP. The report concludes that "[t]here are no planned missions to replace the space environmental sensing capabilities removed from NPOESS. A loss of continuity of critical measurements will occur when existing on-orbit operational systems complete their missions during the next decade." They judge that anticipated losses range from "moderate" (for plasma, which can determine how badly communications are affected by solar events) to "extreme" (in the case of the Electron Density Profile measurement, without which it is harder to determine what is happening to satellites). While the sensors would not be available in time to monitor the approaching peak in the Sun's 11-year cycle, they would arrive on station to carry through the next. NOAA states that they are now discussing a follow-on mission with NASA and the Air Force.

While unrelated to the NPOESS sensors, the OFCM also noted that the primary early-warning space weather sensor, NASA's Advanced Composition Explorer (ACE), has passed its tenth anniversary. Originally designed for a two-and-a-half year mission, it continues in service to allow NOAA to provide advance warnings of one-half to one hour for solar events that will affect the Earth's atmosphere and magnetic field. Such warnings to airlines, power companies and communications firms give enough time to take steps to reduce disruptions in vital services. ACE is the latest instance of the lack of long-term planning for developing improved operational capabilities from research programs. Further, in May NOAA reported that the X-Ray Sensor on all of the newer Geostationary Operational Environmental Satellites had failed. The agency is currently depending on the last working sensor on the oldest (GOES–10) satellite to track solar flares and working to obtain equivalent data from other missions.

Chairman LAMPSON. This hearing will come to order. Good morning, everyone. We once again meet to keep abreast of the National Polar-Orbiting Operational Environmental Satellite System. When launched, NPOESS will be the primary source of information the National Weather Service uses to make its long-range forecasts. Our military services will need NPOESS data to plan operations around the globe. This Committee has given sustained attention to this program because it is so very vital to our daily lives.

NPOESS is having a difficult birth. The Government Accountability Office once more has to report that instability continues to beset the program. Last year GAO recommended that the program managers needed to complete the basic planning and management documents to assure that everyone understands the schedule, the objectives, and the resources. It is a year later, and GAO still has to recommend getting this basic task done. The Under Secretary for Defense for Acquisitions, Logistics and Technology, Mr. John Young, has ordered these to be finished by the end of August or funding will be cut off. Admiral Lautenbacher will assure us most strenuously that this time the paperwork will get finished, and I want to discuss that with him later.

I would like to have had Mr. Young here to talk about his memorandum and his views on the management of the NPOESS program. Unfortunately, it wasn't until last week that we knew it had been issued. I hope Admiral Lautenbacher will explain why a memo he received in May did not reach us until June, and then from GAO. This committee, under both Democratic and Republican leadership, has done its utmost to assist NOAA in keeping this program on track. The Committee has always expected to be kept fully and completely informed and I expect Admiral Lautenbacher to assure us that will always be the case.

Costs for this program are still not under control. Despite assurances that the program was adhering to its $12.5 billion life cycle cost estimate, GAO believes that we can expect another increase of $1.1 billion. Some $300 million represents the cost of recovery from the problems with the VIIRS[1] and CrIS[2] sensors last year.

Technical problems are still not resolved. A week ago today NOAA informed us that some of the screw heads on the VIIRS instrument were found to be sheared off as it was being prepared for testing. Early indications are that the posts into which the screws are driven were improperly made. In the worst case, the VIIRS unit will have to be completely disassembled to replace all of these so-called "jack posts." Doing so will mean yet another delay in launching the NPP precursor mission. While NOAA hopes that this won't be required, the history of VIIRS argues that the worst case is only half as bad as what will finally come to pass.

This is not the situation we hoped to be in at this point in time. The Executive Committee must expeditiously make decisions and act to resolve these problems. The risk of a data gap is growing along with the cost of this program. This Committee wants to know how these problems are going to be resolved and when we can expect some good news.

---

[1] Visible Infrared Imaging Radiometer Suite
[2] Cross-Track Infrared Sounder

I welcome back our witnesses, Mr. Powner and Admiral Lautenbacher, for whom this is familiar ground, and recognize Mr. Inglis for his opening statement.

[The prepared statement of Chairman Lampson follows:]

PREPARED STATEMENT OF CHAIRMAN NICK LAMPSON

Good morning. We once again meet to keep abreast of the National Polar-Orbiting Operational Environmental Satellite System. When launched, NPOESS will be the primary source of information the National Weather Service uses to make its long-range forecasts. Our military services will need NPOESS data to plan operations around the globe. This committee has given sustained attention to this program because it is so vital to our daily lives.

NPOESS is having a difficult birth. The Government Accountability Office once more has to report that instability continues to beset the program. Last year GAO recommended that the program managers needed to complete the basic planning and management documents to assure that everyone understands the schedule, objectives and resources. It's a year later and GAO still has to recommend getting this basic task done. The Under Secretary for Defense for Acquisitions, Logistics and Technology, Mr. John Young, has ordered these to be finished by the end of August or funding will be cut off. Admiral Lautenbacher will assure us most strenuously that this time the paperwork will get finished. I want to discuss that with him later.

I would like to have had Mr. Young here to talk about his memorandum and his views on the management of the NPOESS program. Unfortunately, it wasn't until last week that we knew it had been issued. I hope Admiral Lautenbacher will explain why a memo he received in May did not reach us until June, and then from GAO. This committee, under both Democratic and Republican leadership, has done its utmost to assist NOAA in keeping this program on track. The Committee has always expected to be kept fully and completely informed and I expect Admiral Lautenbacher to assure us that will always be the case.

Costs for this program are still not under control. Despite assurances that the program was adhering to its $12.5 billion life cycle cost estimate, GAO believes that we can expect another increase of $1.1 billion. Some $300 million represents the cost of recovery from the problems with the VIIRS and CrIS sensors last year.

Technical problems are still not resolved. A week ago today NOAA informed us that some of the screw heads on the VIIRS instrument were found to be sheared off as it was being prepared for testing. Early indications are that the posts into which the screws are driven were improperly made. In the worst case, the VIIRS unit will have to be completely disassembled to replace all of these so-called "jack posts." Doing so will mean yet another delay in launching the NPP precursor mission. While NOAA hopes that this won't be required, the history of VIIRS argues that the worst case is only half as bad as what will finally come to pass.

This is not the situation we hoped to be in at this point in time. I have grave concerns about this program. The Executive Committee must expeditiously make decisions and act to resolve these problems. The risk of a data gap is growing along with the cost of this program. This committee wants to know how these problems are going to be resolved and when we can expect some good news.

I welcome back our witnesses, Mr. Powner and Admiral Lautenbacher, for whom this is familiar ground, and recognize Mr. Inglis for his opening statement.

Mr. INGLIS. Thank you, Mr. Chairman. Thank you for holding this hearing about the National Polar-Orbiting Operational Environmental Satellite System, NPOESS. This hearing continues close oversight of this vital weather satellite program, oversight that started under Republican leadership of this committee. Last June we met to discuss a GAO report's finding on the progress of the NPOESS program. Mr. Powner, you were here to present that report one year ago, and now you are back again with additional findings. This feels almost like satellite club reunion, I suppose. But in June of 2007, it seemed that the program was on track under the new plan. However, given the significant changes that were being made to the capability of the system, I and many of my colleagues stressed that close oversight had to continue or the repercussions would be costly. And we are here again, and again we

are stressing the importance of oversight and rightly so I think. Things are less at ease than they were last year. Costly is a good word to describe the progress of the program over the past 12 months. $12.5 billion was NPOESS's price tag in June 2007. Today it is $13.6 billion, and there is another increase looming on the horizon.

The Department of Defense has already announced that if major management documents are not finalized by September, DOD will remove funding. If that happens, the Department of Commerce would be forced to follow suit and remove funding as well. This loss of funding would mean a significant setback in the investment and progress of the NPOESS program.

It is said that NPOESS is the most complex environmental satellite system ever deployed, and given what we have gone through in this committee alone in the past few years, I believe it. I also believe that all of us involved—Congress, NOAA, the Air Force, and NASA—have a vested interest in making sure that the system succeeds despite the complexities. NPOESS holds the complexities for advanced climate and weather sensing which, even in light of the cost, can mean great benefits for our country and for the world. NPOESS today is a $13.6 billion program. That is a lot of taxpayer money. We need weather satellites that are launched on time and to provide data that informs everything from decisions about our military troop operations to forecasting the path of hurricanes.

Thank you again, Mr. Chairman. I look forward to hearing from our witnesses.

[The prepared statement of Mr. Inglis follows:]

PREPARED STATEMENT OF REPRESENTATIVE BOB INGLIS

Good morning. Thank you, Chairman Lampson, for holding this hearing about the National Polar-orbiting Operational Environmental Satellite System, NPOESS. This hearing continues close oversight of this vital weather satellite program, oversight that started under Republican leadership of this committee.

Last June, we met to discuss a GAO report's findings on the progress of the NPOESS program. Mr. Powner, you were here to present that report one year ago, and now you're back again with additional findings—this feels almost like a Satellite club reunion!

In June 2007, it seemed that the program was on track under the new plan. However, given that significant changes were being made to the capability of the system, I, and many of my colleagues, stressed that close oversight had to continue, or the repercussions would be costly.

And we're here again, and again we're stressing the importance of oversight. And rightly so, I think. Things are less "at ease" then they were last year. "Costly" is a good word to use to describe the progress of the program over the past 12 months. $12.5 billion was the NPOESS price tag in June 2007. Today, it's $13.6 billion. And there's another increase looming on the horizon. The Department of Defense has recently announced that if major management documents are not finalized by September, DOD will remove funding. If that happens, the Department of Commerce would be forced to follow suit and remove funding as well. This loss of funding would mean a significant setback in the investment and progress of the NPOESS program.

It is said NPOESS is "the most complex environmental satellite system ever developed," and given what we've gone through in this committee alone in the past few years, I believe it. I also believe that all of us involved, Congress, NOAA, the Air Force, and NASA have a vested interest in making sure that the system succeeds, despite the complexities. NPOESS holds the capability for advanced climate and weather sensing, which, even in light of the cost, can mean great benefits for our country and the world.

NPOESS today is a $13.6 billion program. That is a lot of taxpayer money. We need weather satellites that are launched on time and that provide data that in-

forms everything from decisions about our military troop operations to forecasting the path of hurricanes.

Thank you again, Mr. Chairman, and I look forward to hearing from our witnesses.

Chairman LAMPSON. Thank you, Mr. Inglis. I ask unanimous consent that all additional opening statements submitted by Committee Members be included in the record. Without objection, so ordered.

[The prepared statement of Mr. Costello follows:

PREPARED STATEMENT OF REPRESENTATIVE JERRY F. COSTELLO

Thank you, Mr. Chairman, for holding this hearing today, as this is an important opportunity to follow-up on our hearing from last year and to learn more about the National Polar-Orbiting Operational Environmental Satellite System (NPOESS).

I look forward to hearing a status update from Admiral Lautenbacher and Mr. Powner, as the program is fundamental to the National Oceanic and Atmospheric Administration's (NOAA) weather missions.

As Chairman of the Transportation Subcommittee on Aviation, I am particularly aware of the contribution that NOAA makes to the safety of our environment, particularly to aviation travel. Although questions have been raised about the stability of the NPOESS, it is my hope that this hearing will help guide the program in the right direction and answer any lingering administrative questions.

Thank you, Mr. Chairman, and I yield back the remainder of my time.

Chairman LAMPSON. It is my pleasure to introduce our witnesses this morning. Mr. David Powner is the Director for Information Technology Management Issues at the Government Accountability Office. Vice Admiral Conrad Lautenbacher is the Under Secretary for Oceans and Atmosphere and Administrator of the National Oceanic and Atmospheric Administration. And I might add at this point, yesterday I was at the Partnership for Public Service and witnessed a couple of your folks receiving some very nice public service awards. One of them happened to have been a classmate of mine from college, Dr. Eddie Beaumont, and it was a real pleasure seeing him but more importantly, knowing what he has accomplished for our country. Very impressed.

You will each have five minutes for your spoken testimony. Your written testimony will be included in the record for the hearing. When you all complete your testimony, we will begin with questions. Each Member will have five minutes to question the panel, and Mr. Powner, you may begin.

STATEMENT OF MR. DAVID A. POWNER, DIRECTOR, INFORMATION TECHNOLOGY MANAGEMENT ISSUES, GOVERNMENT ACCOUNTABILITY OFFICE

Mr. POWNER. Chairman Lampson, Ranking Member Inglis, and Members of the Subcommittee, we appreciate the opportunity to testify on our latest NPOESS report being released today.

This morning I will briefly address three areas: first, the status of NPOESS's restructuring which is taking too long to complete and now raises serious questions about DOD's commitment to and funding of the program; second, key risk areas and their potential cost implications which will at least add $1 billion to NPOESS's life cycle costs; and third, the need for long-term strategy to restore climate and space sensors that were removed from the NPOESS program as part of the June 2006 restructuring.

Before discussing these three points, I would like to highlight NPOESS's progress in several areas. The program has redefined deliverables, cost, and schedules and renegotiated the contract, made significant progress in completing development and testing activities associated with spacecraft sensors and ground systems, and it continues to improve its management of the contractor and program risks.

Last May when we testified before you, Mr. Chairman, we raised serious concerns about interagency coordination because key acquisition documents were not signed by their September 2006 due date following the Nunn-McCurdy restructuring. We highlighted at that time the urgency in signing these documents to ensure interagency agreements. Although some documents have been finalized, agency executives have yet to finalize several key documents needed to effectively manage this tri-agency program, including the acquisition program baseline and a critical plan for how the European satellite data will be used with NPOESS. Now DOD has stated it will not release fiscal year 2009 funds to the program if these documents are not finalized by the end of August. On the surface, DOD's threat appears to be a good thing, given that the new August deadline is now nearly two years later than the original deadline. However, DOD is equally at fault here since most of the documents in question are currently at DOD awaiting approval.

Mr. Chairman, such delays, threats, and lack of leadership and cooperation are unacceptable. It is time for the NPOESS EXCOM[3] members to step up, get these documents finalized to ensure key interagency agreements and to not risk any funding implications. Regarding key risks and potential cost implications, key risk areas that concern us the most are the technical sensor risks, changes to the security approach, and the uncertainty of operations and support costs. Poor workmanship and delays caused an eight-month slip in the delivery of VIIRS which caused a corresponding eight-month slip in the launch of NPOESS's demonstration satellite, NPP.

The CrIS sensor has also experienced cost overruns and scheduling delays, but VIIRS continues to be the program's largest question mark. It is complex, continues to experience problems in testing, and is clearly the most concerning aspect of this acquisition. The program estimates that it will cost at least an additional $300 million to fix these known technical sensor issues.

Turning to security, the program is considering raising the level of security measures associated with NPOESS's ground stations. The program has been looking at these options but has yet to finalize, release its findings, or agree to a final approach. Building in security late in the development cycle will be costly regarding the operations and support costs. Following the Nunn-McCurdy decision, the operations and support costs were estimated to be about a billion dollars. Now, both the program office and DOD's cost analysis group are refining the estimate which we expect to be at least $800 million higher. Therefore, between the technical sensor issues, increasing security controls, and having a more realistic operations and support estimate, we expect the $12.5 billion life cycle cost es-

[3] Executive Committee

timate to increase at least $1 billion but would not be surprised if the revised life cycle cost estimate approaches $14 billion.

Finally, Mr. Chairman, some progress has been made in restoring selected climate and space sensors that were removed to reduce risk and cost during the Nunn-McCurdy decision. Specifically, two sensors are being placed on NPP and one will now go on the first NPOESS satellite known as C–1. These will both help with short-term needs. In addition, options for restoring these sensors have been studied. Now decisions need to be made and plans need to be developed for longer-term continuity of climate and space sensors. The Office of Science and Technology Policy has been working with the three agencies, but there is no firm commitment when such a plan would be developed. Accordingly, we recommended that a plan be developed to ensure that there are no gaps in critical space, environmental, and climate observations.

In summary, Mr. Chairman, the NPOESS program needs to finalize the acquisition documents, revise its life cycle cost estimate given the expected increases associated with sensors, security, and operations and support; and on a broader scale, our nation is in need of a plan to address long-term continuity of climate and space observations.

This concludes my statement. Thank you for your leadership and oversight of this critical program.

[The prepared statement of Mr. Powner follows:]

PREPARED STATEMENT OF DAVID A. POWNER

Environmental Satellites

Polar-orbiting Satellite Acquisition Faces Delays; Decisions Needed on Whether and How to Ensure Climate Data Continuity

Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to participate in today's hearing to discuss our work on the $12.5 billion National Polar-orbiting Operational Environmental Satellite System (NPOESS) program. NPOESS 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 program: 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). To manage the NPOESS program, these agencies established a tri-agency integrated program office. In recent years, the program has experienced escalating costs, schedule delays, and technical difficulties, which led to a June 2006 decision to restructure it. This decision decreased the complexity of the program by reducing the number of satellites and sensors, increased the estimated cost of the program to $12.5 billion, and delayed the launches of the first two satellites by three and five years, respectively.

As requested, this statement summarizes our report being released today that (1) evaluates the NPOESS program office's progress in restructuring the acquisition, (2) assesses the status of key program components and risks, (3) and assesses NASA's,

NOAA's, and DOD's plans for obtaining the environmental data originally planned to be collected by NPOESS sensors, but then eliminated by the restructuring.[1]

In preparing this testimony, we relied on our work supporting the accompanying report. That report contains a detailed overview of our scope and methodology. In addition, we updated factual information on sensors and due dates as warranted. All the work on which this testimony is based was performed in accordance with generally accepted government auditing standards.

Results in Brief

The NPOESS program office has completed most of the major activities associated with restructuring the acquisition, but key activities remain to be completed. In the past year, the program redefined the program's deliverables, costs, and schedules, and renegotiated the NPOESS contract. However, agency executives have not yet finalized selected acquisition documents, including the tri-agency memorandum of agreement and the acquisition program baseline. In April 2007, we reported that key acquisition documents were already over six months late and recommended that agency officials complete them immediately.[2] Agency officials subsequently extended the due dates of the documents. Moreover, although DOD has had a role in delaying their completion, the Department has stated it would not release fiscal year 2009 funds to the NPOESS program if key acquisition documents are not completed by August 2008. Without executive approval of the memorandum of agreement and other key documents, the program lacks the underlying commitment needed to effectively manage a tri-agency program. In addition, given DOD's recent instructions, any further delays in completing these documents could affect the program's funding and schedule.

In the past year, the NPOESS program has made progress in completing development and testing activities associated with the spacecraft, sensors, and ground systems. However, key milestones have been delayed and multiple risks remain. Specifically, poor workmanship and testing delays caused an eight-month slip in the delivery of a complex imaging sensor called the Visible/infrared imager radiometer suite. This late delivery caused a corresponding eight-month delay in the expected launch date of the NPOESS Preparatory Project demonstration satellite, moving it from late September 2009 to early June 2010. Any delay in this launch date shortens the time available for identifying lessons learned from the demonstration satellite while it is in orbit and incorporating these lessons in the development of the first NPOESS satellite. Such delays could also lead to gaps in weather and climate data continuity if existing satellites begin to degrade or fail. Moving forward, risks remain in completing the testing of key sensors and integrating them on the spacecraft, resolving interagency disagreements about the appropriate level of system security, and revising outdated operations and support cost estimates—which program officials say could increase the life cycle cost by about $1 billion. The program office is aware of these risks and is working to mitigate them, but these issues could affect the program's overall schedule and cost.

When the NPOESS restructuring agreement removed four climate and space environment sensors from the program and degraded four others, it led NASA, NOAA, and DOD to reassess their priorities and options for obtaining climate and space environment data. Since the June 2006 restructuring decision, the three agencies have taken preliminary steps to restore the capabilities of selected climate and space weather sensors that were removed from the NPOESS program by prioritizing the sensors, assessing options for restoring them, and making decisions to mitigate near-term data continuity needs by restoring two sensors to the demonstration satellite and one sensor to the first NPOESS satellite. However, the agencies have not yet developed plans on whether and how to ensure climate and space weather data on a long-term basis as no plans have been made for sensors or satellites after the first satellite of the program. Until such a plan is developed, the agencies may lose their windows of opportunity for selecting cost-effective options or they may resort to an ad hoc approach to restoring these sensors. Almost two years have passed since key sensors were removed from the NPOESS program; further delays in establishing a plan could result in gaps in the continuity of climate and space data.

In our report, we made recommendations to all three agencies to establish plans on whether and how to restore the climate and space sensors removed from the NPOESS program by June 2009, in cases where the sensors are warranted and jus-

---

[1] GAO, *Environmental Satellites: Polar-orbiting Satellite Acquisition Faces Delay; Decisions Needed on Whether and How to Ensure Climate Data Continuity,* GAO–08–518 (Washington, D.C.: May 16, 2008).

[2] GAO, *Polar-orbiting Operational Environmental Satellites: Restructuring is Under Way, but Technical Challenges and Risks Remain,* GAO–07–498 (Washington, D.C.: April 27, 2007).

tified. In addition, we also reemphasized a recommendation made in our prior report[3] that the appropriate NASA, NOAA, and DOD executives immediately finalize key acquisition documents. All three agencies concurred with these recommendations.

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—managed by NOAA—and the Defense Meteorological Satellite Program (DMSP)—managed by the Air Force. These satellites obtain environmental data that are processed to provide graphical weather images and specialized weather products—including both terrestrial and space weather. These satellite data are also the predominant input to numerical weather prediction models, which are a primary tool for forecasting weather three 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 their 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.

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 through the year 2026. To manage this program, DOD, NOAA, and NASA formed the tri-agency Integrated Program Office, located within NOAA.

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; DOD 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 costs of funding NPOESS, while NASA funds specific technology projects and studies. The NPOESS program office is overseen by an Executive Committee, which is made up of the Administrators of NOAA and NASA and the Under Secretary of the Air Force.

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 environmental data records (EDR) and is to be located at four data 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 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 three subsystems. Together, the sensors were to receive and transmit data on atmospheric, cloud cover, environmental, climatic, oceanographic, and solar-geophysical observations. The subsystems were to support non-environmental search and rescue efforts, 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.

[3] GAO–07–498

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

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	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 noncritical 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.[5]

When the NPOESS development contract was awarded, the schedule for launching the satellites was driven by a requirement that the satellites be available to back up the final POES and DMSP satellites should anything go wrong during the planned launches of these satellites. 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 in March 2008, and (3) having the second NPOESS satellite available to back up the final DMSP satellite launch in 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.

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

Over several years, we reported that NPOESS had experienced continued cost increases, schedule delays, and serious technical problems.[6] 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 two 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

[5] 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.

[6] GAO, *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); GAO, *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); GAO, *Polar-orbiting Environmental Satellites: Information on Program Cost and Schedule Changes,* GAO–04–1054 (Washington, D.C.: Sept. 30, 2004); GAO, *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 GAO, *Polar-orbiting Environmental Satellites: Status, Plans, and Future Data Management Challenges,* GAO–02–684T (Washington, D.C.: July 24, 2002).

specific actions when a major defense acquisition program cost growth exceeds certain thresholds.[7] The law requires 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 current program to Congress when it is expected to overrun its baseline by 25 percent or more.[8] 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.[9] This decision approved a cost increase of $4 billion over the prior approved baseline cost and delayed the launch of NPP and the first two satellites by roughly three to five years. The new program also entailed reducing the number of satellites to be produced and launched from six to four, and reducing the number of instruments on the satellites from 13 to nine—consisting of seven environmental sensors and two subsystems. It also entailed using NPOESS satellites in the early morning and afternoon orbits and relying on European satellites for mid-morning orbit data.[10] Table 2 summarizes the major program changes made under the Nunn-McCurdy certification decision.

Table 2: Summary of Changes to the NPOESS Program, as of June 2006

Key area	Program before the Nunn-McCurdy decision	Program after the Nunn-McCurdy decision
Life cycle range	1995-2020	1995-2026
Estimated life cycle cost	$8.4 billion	$12.5 billion
Launch schedule	NPP by October 2006 First NPOESS by November 2009 Second NPOESS by June 2011	NPP by January 2010* First NPOESS by January 2013 Second NPOESS by January 2016
Management structure	System Program Director reports to a tri-agency steering committee and a tri-agency Executive Committee Independent program reviews noted insufficient system engineering and cost analysis staff	System Program Director is responsible for day-to-day program management and reports to the Program Executive Officer 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.

*Although the Nunn-McCurdy certification decision specifies NPP is to launch by January 2010, NASA planned to launch it by September 2009 to reduce the possibility of a climate data continuity gap.

The Nunn-McCurdy certification decision established new milestones for the delivery of key program elements, including launching NPP by January 2010, launching the first NPOESS satellite by January 2013, and launching the second NPOESS satellite by January 2016. These revised milestones deviated from prior plans to have the first NPOESS satellite available to back up the final POES satellite should anything go wrong during that launch.

[7] 10 U.S.C. § 2433 is commonly referred to as Nunn-McCurdy.

[8] 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.

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

[10] The European Organization for the Exploitation of Meteorological Satellites' 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.

Delaying the launch of the first NPOESS satellite meant that if the final POES satellite fails on launch, satellite data users would need to rely on the existing constellation of environmental satellites until NPP data becomes available—almost two years later. Although NPP was not intended to be an operational asset, NASA agreed to move NPP to a different orbit so that its data would be available in the event of a premature failure of the final POES satellite. If the health of the existing constellation of satellites diminishes—or if NPP data is not available, timely, and reliable—there could be a gap in environmental satellite data.

In order to reduce program complexity, the Nunn-McCurdy certification decision decreased the number of NPOESS sensors from 13 to nine and reduced the functionality of four sensors. Specifically, of the 13 original sensors, five sensors remain unchanged (but two are on a reduced number of satellites), three were replaced with older or less capable sensors, one was modified to provide less functionality, and four were canceled. The certification decision also made allowances for the reintegration of the canceled sensors. Specifically, the program was directed to build each NPOESS spacecraft with enough room and power to accommodate the sensors that were removed from the program and to fund the integration and testing of any sensors that are later restored. Agency sponsors external to the program would be responsible for justifying and funding the sensor's development, while the NPOESS Executive Committee would have the final decision on whether to include the sensor on a specific satellite. Table 3 identifies the changes to the NPOESS instruments.

Table 3: Changes to NPOESS Instruments (critical sensors in bold)

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[a]
Ozone mapper/profiler suite	One part of the sensor (OMPS-Limb) was canceled; remaining part is to be included on NPP and on all four NPOESS satellites[a]
Radar altimeter	Sensor was canceled[a]
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]
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 certification 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 environmental data records (EDR). 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 six 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.

Major Restructuring Activities Have Been Completed, but Key Remaining Activities Could Affect Funding and Schedule

The program office has completed major activities associated with restructuring NPOESS, but key supporting activities remain—including obtaining approval of key acquisition documents—and delays in completing these activities could affect the program's funding and schedule. Restructuring a major acquisition program like NPOESS is a process that involves reassessing and redefining the program's

deliverables, costs, and schedules, and renegotiating the contract. The restructuring process also involves revising important acquisition documents such as the tri-agency memorandum of agreement, the acquisition strategy, the system engineering plan, the integrated master schedule defining what needs to happen by when, and the acquisition program baseline. In April 2007, we reported that the key acquisition documents were over six months late from their original September 2006 due date, and we recommended that the appropriate executives immediately finalize them.[11] This recommendation has not yet been addressed and agency officials subsequently extended the due dates of the documents to September 2007.

During the past year, the program redefined the program's deliverables, costs, and schedules, and renegotiated the NPOESS contract. To do so, the program developed a new program plan and conducted an integrated baseline review of the entire program, which validated that the new deliverables, costs, and schedules were feasible. It also completed key acquisition documents including the system engineering plan and the integrated master schedule. The program and the prime contractor signed a modified contract in July 2007.

However, key activities remain to be completed, including obtaining executive approval of key acquisition documents. Specifically, even though agency officials were expected to approve key acquisition documents by September 2007, the appropriate executives have not yet signed off on documents including the tri-agency memorandum of agreement or the acquisition strategy report. They have also not signed off on the acquisition program baseline, the fee management plan, the test and evaluation master plan, and the two-orbit program plan (a plan for how to use European satellite data with NPOESS).

Program officials stated that the program has been able to renegotiate the contract and to proceed in developing sensors and systems without these documents being signed because the documents have widespread acceptance within the three agencies. They reported that the delays are largely due to the complexity of obtaining approval from three agencies. For example, program officials reported that an organization within DOD suggested minor changes to the tri-agency memorandum of agreement after months of coordination and after it had already been signed by both the Secretary of Commerce and the Administrator of NASA. Further, after this issue was resolved, a senior official at DOD requested another change to the document. The program office has now made the recommended changes and is re-initiating the coordination process.

More recently, in April 2008, DOD moved the due dates for all of the acquisition documents other than the memorandum of agreement and fee management plan from September 2007 to August 31, 2008. (See Appendix I for the history of the due dates and status of each document). In addition, even though DOD has had a role in delaying these documents, the Department has stated it would not release fiscal year 2009 funds to the program if these acquisition documents are not completed by the new due date. Without executive approval of key acquisition documents, the program lacks the underlying commitment necessary to effectively manage a tri-agency program. In addition, given DOD's newest instructions, any further delays in completing these acquisition documents could affect the program's funding and schedule.

Program Has Made Progress, but Key Milestones Have Been Delayed and Risks Remain

Over the last year, the NPOESS program has made progress by completing planned development and testing activities on its ground and space segments, but key milestones for delivering the VIIRS sensor and launching NPP have been delayed by about eight months. Moving forward, risks remain in completing the testing of key sensors and integrating them on the NPP spacecraft, in resolving interagency disagreements on the appropriate level of system security, and in revising estimated costs for satellite operations and support. The program office is aware of these risks and is working to mitigate them, but continued problems could affect the program's overall schedule and cost. Given the tight time frames for completing key sensors, integrating them on the NPP spacecraft, and getting the ground-based data processing system developed, tested, and deployed, it is important for the NPOESS Integrated Program Office, the Program Executive Office, and the Executive Committee to continue to provide close oversight of milestones and risks.

[11] GAO–07–498.

Ground Segment—Progress Made but Important Work Remains to Be Done

Development of the ground segment—which includes the interface data processing system, the ground stations that are to receive satellite data, and the ground-based command, control, and communications system—is under way and on track. For example, the Interface Data Processing System has been installed at one of the two locations that are to receive NPP data, and the command, control, and communications system passed acceptance testing for use with NPP. However, important work in developing the algorithms that translate satellite data into weather products within the integrated data processing segment remains to be completed. Table 4 describes each of the components of the ground segment and identifies the program-provided risk level and status of each.

Table 4: Status of Ground Segment Components

Ground segment component/ description	Program-identified risk level	Status
Interface Data Processing System (IDPS)— A ground-based system that is to process the sensors' data so that they are usable by the data processing centers and the broader community of environmental data users. IDPS will be deployed at the four weather data processing centers.	Low	IDPS software is being developed in a series of builds. In 2007, software developers required additional resources and fell behind schedule on build 1.5 activities due to unanticipated complexities in developing algorithms that will make use of data collected by the Ozone mapper/profiler suite in orbit—as well as late delivery of key information on this instrument. As of January 2008, IDPS build 1.5 had been developed and was undergoing testing to check the quality of its performance; additional builds are planned to be developed prior to launch and will be used with NPP. In January 2008, IDPS hardware was installed at one of the data processing centers (NOAA's National Satellite Operations Facility in Suitland, Maryland) and is expected to be installed at the Air Force Weather Agency this summer. In addition, the Air Force Weather Agency has begun early testing of NPOESS data. Site acceptance testing for NPP is scheduled to be completed in December 2008.
Ground stations for receiving satellite data— 15 unmanned ground stations around the world (called SafetyNet™) are to receive satellite data and send it to the four data processing centers.	Low	NOAA is working with domestic and foreign authorities to obtain approval to operate ground stations to receive satellite data. According to agency officials, the full complement of ground stations will not be in place in time for the first NPOESS satellite launch. The ground stations will be phased in by the launch of the second satellite. To date, the program office has reached agreement with 4 of 15 ground station sites.
Command, control, and communications segment— Performs the day-to-day monitoring and command of the spacecraft and sensors	Low	The command, control, and communications segment is being developed in a series of builds. In August 2007, build 1.4 transitioned from development to operations and support. In addition, the command, control, and communications acceptance testing for NPP has been completed.

Source: GAO summary of NPOESS program office data.

Space Segment—Progress Made, but One Sensor Was Delayed and Sensors Continue to Face Risks

Over the past year, the program made progress on the development of the space segment, which includes the sensors and the spacecraft. Five sensors are of critical importance because they are to be launched on the NPP satellite.[12] Initiating work on another sensor, the Microwave Imager Sounder, is also important because this new sensor—which is to replace the canceled Conical-scanned microwave imager/sounder sensor—will need to be developed in time for the second NPOESS satellite launch. Among other activities, the program has successfully completed vibration testing of the flight unit of the Cross-track infrared sounder (CrIS), a major pre-environmental testing review for the VIIRS instrument, integration and risk reduction testing of the flight unit of the Ozone mapper/profiler suite, and thermal testing of the NPP spacecraft with three sensors on board.[13] In addition, the program made decisions on how to proceed with the Microwave imager sounder and recently awarded a contract to a government laboratory for its development.

However, the program experienced problems on VIIRS, including poor workmanship on selected subcomponents and delays in completing key tests. These issues delayed VIIRS delivery to the NPP contractor by eight months. This late delivery will in turn delay the satellite's launch from late September 2009 to early June 2010.

[12] NPP is to include the Visible/infrared imager radiometer suite, Cross-track infrared sounder, Advanced technology microwave sounder, Ozone mapper/profiler suite (nadir and limb), and the Clouds and the Earth's radiant energy system.

[13] The three sensors included the flight unit for the Advanced technology microwave sounder and engineering design units for the Visible/infrared imager radiometer suite and the Cross-track infrared sounder.

This delay shortens the time available for incorporating lessons learned from NPP while it is in orbit into future NPOESS missions and could lead to gaps in the continuity of climate and weather data if predecessor satellites fail prematurely. Also, the CrIS sensor experienced a cost overrun and schedule delays as the contractor worked to recover from a structural failure and is currently several weeks behind its schedule due to thermal vacuum testing taking longer than planned. The status and risk level of each of the components of the space segment is described in Table 5.

Table 5: Status of Selected Components of the Space Segment, as of May 2008

Space segment component	Program-identified risk level	Status
Visible/infrared imager radiometer suite (VIIRS)	High	In April 2007, we reported that the contractor had identified a problem with the VIIRS baseline filter during environmental testing that caused degraded performance in the filter's image quality. Specifically, this problem involves light leaking across the seams of the filter, resulting in inaccurate measurements of ocean color. In October 2007, the NPOESS Executive Committee decided to continue sensor development with the baseline filter because changing it would increase risks to sensor development, delay the delivery of the sensor, and risk delays to the launch of NPP. An improved VIIRS filter is planned to be included on the flight units on future NPOESS missions. More recently, the VIIRS contractor experienced problems with workmanship on electrical and cryoradiator components and delays in executing tests.* These factors slowed the sensor's development. The VIIRS flight unit was originally scheduled to be delivered to NPP by July 2008, but due to technical issues and testing schedule delays, VIIRS' delivery to NPP is now planned for April 2009.
Cross-track infrared sounder (CrIS)	Moderate	In April 2007, we reported that development of CrIS was put on hold in October 2006 when the flight unit designated to go on NPP experienced a major structural failure during its vibration testing. Acceptance testing began again in mid-2007, and the structural stability of the frame was approved in August 2007. The flight unit is currently undergoing thermal vacuum testing—which has taken longer than planned. The flight unit was expected to be delivered to NPP by May 2008, but it is now expected to be delivered in August 2008.
Ozone mapper/profiler suite (nadir and limb)	Low	In April 2007, program officials had agreed to fund the reintegration of the limb component on NPP. The first flight unit completed key integration risk reduction testing and is expected to be delivered to the NPP contractor for integration in August 2008.
Advanced technology microwave sounder	Low	The flight unit for NPP was developed by a NASA contractor and delivered to the program in October 2005. The NPP contractor integrated the flight unit on the spacecraft in December 2006 and is awaiting delivery of the other sensors in order to complete integration testing.
Clouds and the earth's radiant energy system	Not yet rated	In January 2008, the NPOESS Executive Committee approved including this instrument on NPP. The sensor has already been built but requires some refurbishment. It is expected to be delivered to the NPP spacecraft for integration in October 2008. In January 2008, the program office was directed to develop an additional sensor for the first NPOESS satellite.
Microwave imager/sounder	Low	A new microwave imager/sounder sensor is being planned to replace the canceled Conical-scanned microwave imager/sounder. In May 2008, the program office selected the U.S. Naval Research Lab to develop the sensor for the second NPOESS satellite. If it is more cost effective to do so, the program office plans to move production of the second and third MIS sensors to a contractor.
Spacecraft	Low	Both the development of the spacecraft for NPP and the spacecraft for NPOESS are on track. • The NPP spacecraft was completed in June 2005. The NPP contractor has completed over a year's worth of risk reduction activities, which included thermal testing of the spacecraft with three of the sensors on board. • The critical design review of the first NPOESS spacecraft is scheduled to be completed in April 2009, with the launch date scheduled for January 2013.

Source: GAO analysis of NPOESS Integrated Program Office data.

* The cryoradiator is a key component of the VIIRS sensor. It is intended to cool down components of the sensor.

Program Risks Remain; Continued Oversight Is Needed to Prevent Further Cost Increases and Schedule Delays

Moving forward, the program continues to face risks. Over the next two years, it will need to complete the development of the key sensors, test them, integrate and test them on the NPP spacecraft, and test these systems with the ground-based data processing systems. In addition, the program faces two other issues that could affect its overall schedule and cost. One is that there continues to be disagreement between NOAA and DOD on the appropriate level of system security. To date, NPOESS has been designed and developed to meet DOD's standards for a mission essential system, but NOAA officials believe that the system should be built to meet more stringent standards.[14] Implementing more stringent standards could cause rework and retesting, and potentially affect the cost and schedule of the system. Another issue is that program life cycle costs could increase once a better estimate of

[14] NOAA officials have stated that they believe the program should be built to a "high" security level per Federal Information Processing Standards Publication 199.

the cost of operations and support is known. The $12.5 billion estimated life cycle cost for NPOESS includes a rough estimate of $1 billion for operations and support.

The NPOESS program office is working closely with the contractor and subcontractors to resolve these program risks. To address sensor risks, the program office and officials from NASA's Goddard Space Flight Center commissioned an independent review team to assess the thoroughness and adequacy of practices being used in the assembly, integration, and testing of the VIIRS and CrIS instruments in preparation for the NPP spacecraft. The team found that the contractors for both sensors had sound test programs in place, but noted risks with VIIRS's schedule and with CrIS's reliability and performance. The program office adjusted the VIIRS testing schedule and is monitoring the CrIS testing results. In addition, the program office recently instituted biweekly senior-level management meetings to review progress on VIIRS's development, and program officials noted that both the prime contractor and the program executive office will have senior officials on-site at the contractor's facility to provide extensive, day-to-day oversight of management activities to assist in resolving issues.

To address the risk posed by changing security requirements late in the system's development, program officials commissioned a study to determine the effect of more stringent standards on the system. This study was completed in March 2008, but has not yet been released. To address the risk of cost growth due to poor estimates of operations and support costs, DOD's cost analysis group is currently refining this estimate. Program officials estimated that the program costs could grow by about $1 billion, and expect to finalize revised operations and support costs in July 2008.

The program office is aware of program risks and is working to mitigate them, but these issues could affect the program's overall schedule and cost. Given the tight time frames for completing key sensors, integrating them on the NPP spacecraft, and getting the ground-based data processing system developed, tested, and deployed, it is important for the NPOESS program office, the Program Executive Office, and the Executive Committee to continue to provide close oversight of milestones and risks.

Agencies Have Undertaken Preliminary Steps to Restore Key Sensors, but Lack Timely Plans to Ensure Long-Term Data Continuity

When the NPOESS restructuring agreement removed four climate and space environment sensors from the program and degraded four others, it led NASA, NOAA, and DOD to reassess their priorities and options for obtaining climate and space environment data. Since the June 2006 restructuring decision, the three agencies have taken preliminary steps to restore the capabilities of selected climate and space weather sensors that were degraded or removed from the NPOESS program by prioritizing the sensors, assessing options for restoring them, and making decisions to restore selected sensors in order to mitigate near-term data gaps. However, the agencies have not yet developed plans to mitigate the loss of these sensors on a long-term basis. Best practices in strategic planning suggest that agencies develop and implement long-term plans to guide their short-term activities. Until such plans are developed, the agencies may lose their windows of opportunity for selecting cost-effective options or they may resort to an ad hoc approach to restoring these sensors. Lacking plans almost two years after key sensors were removed from the NPOESS program, the agencies face increased risk of gaps in the continuity of climate and space environment data.

While NPOESS was originally envisioned to provide only weather observations, this mission was later expanded to include long-term continuity for key climate data. Maintaining the continuity of climate and space data over decades is important to identify long-term environmental cycles (such as the 11-year solar cycle and multi-year ocean cycles including the El Niño effect) and their impacts, and to detect trends in climate change and global warming. The Nunn-McCurdy restructuring decision removed four sensors and degraded the functionality of four other sensors that were to provide these data. DOD, NASA, and NOAA are now responsible for determining what to restore, how to restore it, and the means for doing so. This responsibility includes justifying the additional funding needed to develop these sensors within their respective agencies' investment decision processes. Best practices of leading organizations call for defining a strategic plan to formalize priorities and plans for meeting mission goals. Such a plan would include the agency's long-term goals for climate and space weather measurements, the short-term activities needed to attain these goals, and the milestones and resources needed to support the planned activities.

NASA, NOAA, and DOD Have Identified Priorities, Assessed Options, and Made Decisions to Restore Selected Sensors

Since the June 2006 restructuring, NASA, NOAA, and DOD have taken preliminary steps to restore sensor capabilities by determining priorities for restoring sensor capabilities, assessing options for obtaining sensor data over time, and making decisions to restore selected sensors. Specifically, in August 2006, the NPOESS Senior User Advisory Group—a group representing NASA, NOAA, and DOD system users—assessed the impact of the canceled or degraded sensors and identified priorities for restoring them. In January 2007, a NOAA and NASA working group on climate sensors prioritized which of the sensors were most important to restore for climate purposes and proposed possible solutions and mitigation efforts. Two other groups—the National Research Council and a NOAA–DOD working group—have also issued reports describing the impact of the loss of climate and space environmental sensors, respectively.[15] Table 6 summarizes the results of these studies.

Table 6: Summary of Studies on Impacts of the Loss of Sensors and Priorities for Restoring Them

Sensor/ Description	Likely impact of sensor loss	Climate Working Group's priority for restoration	NPOESS Advisory Group's priority for restoration
Aerosol polarimetry sensor	•Decreased ability to improve air quality monitoring over time •Decreased ability to improve understanding of aerosol's impact on the earth's radiation budget; that is, whether aerosols play a role in global warming •Decreased ability to study the global distribution of aerosols and the impact of aerosols on climate •Decreased ability to improve military munitions targeting and intelligence collection	6	7
Conical-scanned microwave imager/sounder, to be replaced by the Microwave imager/sounder	•Cancellation of the Conical-scanned microwave imager/sounder raised concerns about the loss of critical environmental data including sea surface temperatures, ice and snow cover, and ocean surface wind speed. •The Microwave imager/sounder is intended to replace the Conical-scanned microwave imager/sounder. However, because the new sensor's capabilities have not yet been fully defined, the impact of the cancellation of the Conical-scanned microwave imager/sounder is not clear.	5	2
Earth radiation budget sensor (being replaced on selected satellites by an existing sensor, the Clouds and the earth's radiant energy system)	•Decreased ability to measure the amount of energy entering and leaving the earth •Reduced ability to determine the causes of climate variability and change •Disruption of an over 28-year measurement heritage of earth radiation budget data, which is needed to assess long-term trends.	2	6
Ozone mapper/profiler suite (limb)	•Decreased ability to understand the health of the ozone layer which absorbs solar ultraviolet radiation that is potentially harmful to humans. •Decreased ability to improve global warming and air quality models to differentiate the impact of changing ozone levels within the atmosphere.	4	4
Space environmental sensor suite (to be replaced on selected satellites by an existing technology sensor, the Space environment monitor)	•Decreased understanding of the effect of space weather on military and civilian communications and electrical systems—and ability to take timely mitigation actions. •Decreased situational awareness for missile intercept capabilities •Decreased ability to assess Global Positioning System (GPS) accuracy	unranked	1
Total solar irradiance sensor	•Decreased ability to understand the influence of natural causes of climate change •Disruption of an over 28-year measurement heritage of solar irradiance data, which is needed to assess long-term trends.	1	5
Radar altimeter	•Reduced number of sea surface height and other ocean measurements used in climate monitoring •Decreased ability to measure sea-air interactions that affect regional weather patterns, such as El Niño. •Decreased understanding of storm intensification (e.g., hurricanes), coastal turbulence, and underwater features important to sailors.	3	3
Survivability sensor	•Sensor was to identify possible threats to the NPOESS spacecraft and has no impact on climate observations.	unranked	8

Source: GAO analysis of NASA, NOAA, DOD, and NRC data.

[15] National Research Council, *Options to Ensure the Climate Record from the NPOESS and GOES–R Spacecraft: A Workshop Report* (Washington, D.C.: 2007), and the Office of the Federal Coordinator for Meteorological Services and Supporting Research, *Impacts of NPOESS Nunn-McCurdy Certification and Potential Loss of ACE Spacecraft Solar Wind Data on National Space Environmental Monitoring Capabilities.* (Washington, D.C.: January 2008). The report committee was co-chaired by the Director of the Space Weather Prediction Center (NOAA) and the Chief of the Integration, Plans, and Requirements division within the U.S. Air Force Directorate for Weather. Agency partners in the Department of Commerce, DOD, NASA, the National Science Foundation, and the Office of the Federal Coordinator for Meteorology concurred with the report.

In addition to prioritizing the sensors, NASA, NOAA, and DOD identified a variety of options for obtaining key sensor data over the next two decades and continue to seek other options. The agencies identified options including adding sensors back to a later NPOESS satellite, adding sensors to another planned satellite, and developing a new satellite to include several of the sensors. Examples of options for several sensors are provided in Figure 1. In addition, in December 2007, NOAA released a request for information to determine whether commercial providers could include selected environmental sensors on their satellites.

In addition to prioritizing sensors and identifying options, over the last year, NASA, NOAA, and DOD have taken steps to restore three sensors on a near-term basis. Specifically, in April 2007, the NPOESS Executive Committee decided to restore the limb component of the Ozone mapper/profiler suite to the NPP satellite; in January 2008, to add the Clouds and the Earth's radiant energy sensor to NPP; and in May 2008 to add the Total solar irradiance sensor to the first NPOESS satellite. These decisions are expected to provide continuity for these sensors through approximately 2015. Table 7 shows the latest planned configuration of NPOESS satellites. NASA officials noted that they also took steps to mitigate a potential gap in total solar irradiance data by proposing to fund an additional four years of the SORCE mission (from 2008 to 2012).

Table 7: Planned Configuration of Instruments on NPP and NPOESS Satellites, as of May 2008 (critical sensors are in bold)

Instrument	NPP	NPOESS C1 (PM)	NPOESS C2 (AM)	NPOESS C3 (PM)	NPOESS C4 (AM)
Advanced technology microwave sounder (unchanged)	X	X	O	X	O
Aerosol polarimetry sensor (canceled)	—	O	—	O	—
Microwave imager/sounder (replacing the canceled Conical-scanned microwave imager/sounder)	—	—	X	X	X
Cross-track infrared sounder (unchanged)	X	X	O	X	O
Data collection system (unchanged)	—	X	X	X	X
Earth radiation budget sensor (canceled, but replaced on NPP and C1 by the Clouds and the earth's radiant energy system sensor)	X	X	—	O	—
Ozone mapper/profiler suite (nadir-unchanged)	X	X	—	X	—
Ozone mapper/profiler suite (limb) (canceled, but added to NPP)	X	O	—	O	—
Radar altimeter (canceled)	—	—	O	—	O
Space environmental sensor suite (canceled)	—	O	O	O	O
Space environment monitor (replacing selected capabilities of the space environmental sensor suite)	—	X	—	X	—
Total solar irradiance sensor (canceled but added to NPOESS C1)	—	X	O	—	O
Survivability sensor (canceled)	—	O	O	O	O
Search and rescue satellite aided tracking system (unchanged)	—	X	X	X	X
Visible/infrared imager radiometer suite (unchanged)	X	X	X	X	X

Source: GAO analysis of program office data.

Key:

X = Sensor is currently planned for this satellite

O = Sensor was canceled but could be restored to this satellite

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

Agencies Lack Plans to Ensure Long-Term Data Continuity

While NASA, NOAA, and DOD have taken preliminary steps to address the climate and space sensors that were removed from the NPOESS program almost two years ago, they do not yet have plans for restoring climate and space environment data on a long-term basis. Specifically, there are as yet no firm plans for obtaining most of this data after 2015. The Office of Science and Technology Policy, an organization within the Executive Office of the President, is currently working with NASA, NOAA, and DOD to sort through the costs and benefits of the various options and to develop plans. However, this effort has been under way for almost two years and officials could not estimate when such plans would be completed.

Delays in developing a comprehensive strategy for ensuring climate and space data continuity may result in the loss of selected options. For example, NASA and NOAA estimated that they would need to make a decision on whether to build another satellite to obtain ocean altimeter data in 2008. Also, the NPOESS program office estimated that if any sensors are to be restored to an NPOESS satellite, it would need a decision about six years in advance of the planned satellite launch. Specifically, for a sensor to be included on the second NPOESS satellite, the sponsoring agency would need to commit to do so by January 2010.

Without a timely decision on a plan for restoring satellite data on a long-term basis, NASA, NOAA, and DOD risk losing their windows of opportunity on selected options and restoring sensors in an ad hoc manner. Ultimately, the agencies risk a break in the continuity of climate and space environment data. As national and international concerns about climate change and global warming grow, these data are more important than ever to try to understand long-term climate trends and impacts.

GAO Made Recommendations to Ensure That Future Climate Needs Are Addressed and to Complete Restructuring Activities

Because of the importance of effectively managing the NPOESS program to ensure that there are no gaps in the continuity of critical weather, environmental, and climate observations, in our accompanying report[16] we made recommendations to the Secretaries of Commerce and Defense and to the Administrator of NASA to establish plans on whether and how to restore the climate and space sensors removed from the NPOESS program by June 2009, in cases where the sensors are warranted and justified. In their comments on the report, all three agencies concurred with our recommendations. In addition, both the Department of Commerce and NASA reiterated that they are working with their partner agencies to finalize plans for restoring sensors.

[16] GAO–08–518.

In addition, we also reemphasized a recommendation made in our prior report that the appropriate NASA, NOAA, and DOD executives immediately finalize key acquisition documents. All three agencies also concurred with this recommendation. Further, Commerce noted that DOD and NASA executives need to weigh in to resolve issues at, or immediately below, their levels in order to ensure prompt completion of the key acquisition documents. NASA noted that difficulties in gaining consensus across all three NPOESS agencies have delayed the signature of key acquisition documents, and reported that they are committed to moving these documents through the signature cycle once all of the issues and concerns are resolved.

In summary, over the past year, program officials have completed major activities associated with restructuring the NPOESS program and have made progress in developing and testing sensors, ground systems, and the NPP spacecraft. However, multiple risks remain. Agency executives have still not signed off on key acquisition documents that were originally to be completed in September 2006, and now DOD is threatening to withhold funding if the documents are not completed by August 2008—even though DOD has contributed to the delays in completing these documents. Also, one critical sensor has experienced technical problems and schedule delays that have led program officials to delay the NPP launch date by about eight months. Any delay in the NPP launch date shortens the time available for incorporating lessons learned from NPP onto future NPOESS missions and could also lead to gaps in critical climate and weather data. In addition, risks to the program remain in resolving interagency disagreements on the appropriate level of system security and in revising estimated costs for satellite operations and support. The program office is aware of these risks and is working to mitigate them, but continued problems could affect the program's overall schedule and cost.

When selected climate and space weather sensors were removed from the NPOESS program during its restructuring, NASA, NOAA, and DOD became responsible for determining what environmental data to restore and how to restore them. This responsibility includes justifying the additional funding needed to develop these sensors within their respective agency's investment decision processes. In the two years since the restructuring, the agencies have identified their priorities and assessed their options for restoring sensor capabilities. In addition, the agencies made decisions to restore two sensors to the NPP satellite and one to the first NPOESS satellite in order to mitigate near-term data gaps. However, the agencies lack plans for restoring sensor capabilities on a long-term basis. Without a timely decision on a long-term plan for restoring satellite data, the agencies risk a break in the continuity of climate and space environment data. With the increased concern about climate change and global warming, these data are more important than ever to try to understand long-term climate trends and impacts.

Mr. Chairman, this concludes my statement. I would be happy to answer any questions that you or Members of the Committee may have at this time.

If you have any questions on matters discussed in this testimony, please contact me. Other key contributors to this testimony include Colleen Phillips (Assistant Director), Kate Agatone, and Kathleen S. Lovett.

Appendix I: Status of Key Acquisition Documents

Table 1 identifies the key NPOESS acquisition documents as well as their original and revised due dates. Original due dates were specified in the June 2006 restructuring decision memo. The revised due dates were specified in an addendum to that memo, dated June 2007, and then revised again in another addendum, dated April 2008. Documents that are in bold are overdue.

Table 1: Status of NPOESS Acquisition Documents

Acquisition document	Original due date	Revised due date, as of June 2007	Revised due date, as of April 2008	Status
Alternative Management Plan	June 2007	September 1, 2007	Not applicable	Completed
Award Fee Plan/ Fee Management Plan	**Unspecified**	**October 1, 2007**	**Due date not revised—remains October 1, 2007**	**Not completed**
Acquisition Program Baseline	**September 1, 2006**	**December 1, 2007**	**August 31, 2008**	**Not completed**
Acquisition Strategy Report	**September 1, 2006**	**September 1, 2007**	**August 31, 2008**	**Not completed**
Test and Evaluation Master Plan	**September 1, 2006**	**March 1, 2008**	**August 31, 2008**	**Not completed**
System Engineering Plan	September 1, 2006	September 1, 2007	Not applicable	Completed
Two-Orbit Plan	**November 15, 2006**	**October 1, 2007**	**August 31, 2008**	**Not completed**
Human Capital Management Plan (to fill vacancies in the Integrated Program Office)	August 4, 2006	September 1, 2007	Not applicable	Completed
Logistics Support Plan	September 2006	September 1, 2007	Not applicable	Completed
Diminishing Manufacturing Sources/ Parts Obsolescence Plan	September 2006	September 1, 2007	Not applicable	Completed
Tri-agency Memorandum of Agreement	**August 4, 2006**	**September 1, 2007**	**Due date not revised—remains September 1, 2007**	**Not completed**
Integrated Master Plan	April 2007	September 1, 2007	Not applicable	Completed
Quarterly Integrated Baseline Review	September 2006	September 1, 2007	Not applicable	Completed

Source: GAO analysis of DoD and NPOESS program office data.

310679

BIOGRAPHY FOR DAVID A. POWNER

Experience

Twenty years' experience in information technology issues in both public and private sectors.

Education

Business Administration, University of Denver

Senior Executive Fellows Program, Harvard University, John F. Kennedy School of Government

Director, IT Management Issues, U.S. Government Accountability Office

Dave is currently responsible for a large segment of GAO's information technology (IT) work, including systems development, IT investment management, health IT, and cyber critical infrastructure protection reviews.

In the private sector, Dave has held several executive-level positions in the telecommunications industry, including overseeing IT and financial internal audits, and software development associated with digital subscriber lines (DSL).

At GAO, Dave has led teams reviewing major IT modernization efforts at Cheyenne Mountain Air Force Station, the National Weather Service, the Federal Aviation Administration, and the Internal Revenue Service. These reviews covered many information technology areas including software development maturity, information security, and enterprise architecture.

Chairman LAMPSON. Thank you, Mr. Powner. Admiral Lautenbacher, you are recognized for five minutes.

STATEMENT OF VICE ADMIRAL CONRAD C. LAUTENBACHER, JR. (U.S. NAVY, RET.), UNDER SECRETARY OF COMMERCE FOR OCEANS AND ATMOSPHERE; ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

Vice Admiral LAUTENBACHER. Thank you, Mr. Chairman. Chairman Lampson, Ranking Member Inglis, and distinguished Members of the Committee, and staff, I appreciate this opportunity to provide an update on the development of the NPOESS, the National Polar-Orbiting Operational Environmental Satellite System program and discuss the latest Government Accountability Office report. I continue to value and use the input and insight provided by Mr. Powner and his team at GAO.

NOAA's two environmental satellite programs are the backbone of the Nation's hurricane and severe weather forecasting and warning capabilities. Today we are here to talk about our next generation polar satellite program, NPOESS. As you know, the original goal of the NPOESS program was to combine the polar satellite needs and requirements of the Air Force and NOAA into one program while also providing a continuation of certain NASA satellite measurements, mostly in the climate area.

While it has been said before, I must reiterate: satellite acquisitions are complex and difficult endeavors. This program also has the additional complexity of being a tri-agency effort made up of the Department of Commerce, Department of Defense, and NASA. Now, because of the Executive Committee's key decisions that were begun prior to the Nunn-McCurdy review in 2006, management and oversight of this program has been vastly improved, but we still face significant challenges as outlined by GAO.

It is important for the Committee to understand that, as mentioned in the GAO testimony, the other four main instruments, as well as the satellite bus and ground system are on budget, on schedule, and performing well in testing with no significant concerns. I continue to remain concerned, however, about contractor performance and management as it pertains to the Visible/Infrared Imager/Radiometer Suite known as VIIRS. VIIRS continues to be our most challenging instrument to develop. With the government management system now in place, I believe we are better positioned to identify, contain, and manage proactively the challenges as they arise. After testing late last year, for example, showed some technical problems with cooling systems and circuit boards, a complete review was held and the delivery of the instrument had to be delayed about eight months which in turn delayed the NPP NASA launch by eight months from September of 2009 to June 2010. There was no effect on the C–1 through C–4 satellite schedule.

In the last two weeks—to indicate our ability to keep this committee updated—within the last two weeks during integration testing, as mentioned, the program uncovered some quality and workmanship issues with certain fasteners which hold the different pieces of VIIRS together. I am happy to report this morning that

we have received an update last night from our technical assessment team that the effect of this manufacturing flaw will likely be very minimal to the program. At this time we do not anticipate it will delay the delivery of the VIIRS sensor to NPP. I believe this issue is under control at this point.

The Cross-track Infrared Sounder, CrIS, is undergoing final preparation for delivery at the end of July 2008 to begin integration on the NPP satellite. The Ozone Mapping and Profiler Suite, called OMPS, the Limb and Nadir instruments that will fly on NPP have been tested and integrated as a unit. Specifically, regarding GAO's most recent report on NPOESS, the first recommendation calls for plans to restore the climate and space sensors removed from the NPOESS program by June 2009. As the Committee knows, this has been a high priority for NOAA and the Administration. The EXCOM has approved restoring the OMPS Limb and CERES[4] instruments onto NPP and remanifesting TSIS[5] onto the first NPOESS satellite. Meeting the deadlines to integrate these instruments onto NPP and the first NPOESS satellite will require fully funding the Administration's $74 million climate sensor request in the fiscal year 2009 budget. I am pleased to indicate that we have gained support from the Appropriations Committees for these initiatives and look forward to successful work on restoring these sensors.

We are actively working on plans for the rest of the climate sensors de-manifested from NPOESS. In the near-term for Altimetry, the Jason–2 mission is expected to launch this month, and we have begun preliminary work on the Jason–3 mission which will allow continuity through the next couple of decades. With regard to aerosol measurements, they will be continued through the NASA's upcoming *Glory* mission, and we will look at the results from that and work on the follow-on.

Regarding a restoration of the space weather sensors, we continue to work closely with NASA, the Air Force, and the space/weather user community to ensure that plans address user requirements. We have provided the Office of Science and Technology Policy at the White House with a report earlier this year to explain what the issues are, and we are awaiting further direction for the next steps and expect that to happen shortly.

The second recommendation by GAO re-emphasizes the prior recommendation that appropriate NASA, NOAA, and DOD executives immediately finalize key acquisition documents. I wholeheartedly agree with this recommendation. We have made significant progress. Sixteen of the 22 documents have been finalized. My team and I have been working very hard with the EXCOM and DOD to reach the agreements required to complete the six outstanding ADM[6] documents. I am prepared to go through each one and explain the issues that are involved with them if you desire, or I can provide that for the record.

Let me conclude by addressing some concerns that have arisen from a recent internal memo by Mr. John Young, the Under Secretary of Defense for Acquisition, Technology, and Logistics. This

[4] Clouds and Earth's Radiant Energy System
[5] Total Solar Irradiance Sensor
[6] Acquisition Decision Memorandum

memo discussed performance measures for NPOESS components, new cost estimates for the operations of NPOESS, alternative management studies, and completion of the ADM documents. Regarding performance measures for NPOESS, let me assure the Committee that I and my EXCOM partners are committed to ensuring NPOESS fulfills its six key performance parameters. NPOESS will provide roughly 10 times more data at four times the speed of our current satellites. It is a significant increase, and it continues to be on track to do that. Mr. Young's memo was trying to clarify that the whole NPOESS program shouldn't be put at risk to meet a specific performance capability. I agree, as the EXCOM does with Mr. Young. I further clarified in a response letter that the user community and the EXCOM should be involved in any decisions about changes to performance given the Nunn-McCurdy review and our charge to manage the program.

During the Nunn-McCurdy review, the focus—I am on cost estimates now—the focus of cost estimators was on the development and the launch of the satellite program, not on the out-year operational costs which occur far down the line. After the NPOESS contract had been restructured last fall, the EXCOM asked the program budget staff to re-examine the original 2002 estimates for NPOESS operational costs used during the Nunn-McCurdy review. We then asked the DOD independent cost estimators for its review of the operations cost and ensure we had the best information available to deal with this program. Given that the program will now last longer, three to four years longer, it appears that an additional $1 billion is potentially required. We are reconciling at this point the different estimates, and the Executive Committee will make any final budget decisions on the expected increases. These additional operations cost would not be effective until beginning in the 2017 timeframe. They would be normal costs that are applied to our budget as we apply operation costs today to run the satellites we have in position and are again not part of the procurement and development costs.

This timeframe also gives us time to examine alternatives to ensure the most cost-effective solution for these requirements. We believe we have alternatives to deal with those estimates as they exist today. In addition, the program budget staff and the independent cost estimators have identified some likely growth in the NPOESS development and production costs due mostly to the ongoing problems with VIIRS as mentioned, and that regards the need to retain personnel as the next VIIRS units are built. Estimates for these additional costs are still being finalized, and we will reconcile them. It is part of our deliberate process to ensure that next year's budget is properly developed to ensure completion of this system.

The Nunn-McCurdy certification called for the government to make a decision in 2010 whether to proceed with the third and fourth NPOESS satellites under the existing contract or develop an alternative management structure, such as a different prime contractor or having the government manage the instrument production, for instance. PEO[7] has completed and reported to Mr. Young on the first phase of this study and indicated that today no imme-

[7] Program Executive Officer

diate management changes were warranted given what has been put in place. However, the EXCOM has asked for six-month updates as the PEO and the Independent Review Team examine all aspects of the program for any possible changes in preparation for the 2010 decision.

Finally, with regard to Mr. Young's memo, some may suggest its call for the administrative documents to be completed by September 2008 or DOD funding would be re-evaluated shows a lack of commitment to the program. From my experience, the DOD, the Air Force, the Department of Commerce, and the Nation need NPOESS to succeed. It is crucial to our ability to forecast weather, for the war fighter, for our nation's citizens, and for its impact on the Nation's economy. And since Mr. Young and his office are a part of the ADM document process, and I have talked to their office this morning, I have confidence that we can all work together to finish this job very quickly. I appreciate the Committee's continued interest in the success of the NOAA satellite programs. I believe we are doing everything we can possibly think of and bring into effect to keep this program on track. We have instituted large-scale management and oversight reforms. We have government officials at contractor facilities participating in daily activities and daily oversight meetings. We measure the daily cost/schedule performance of the program at innumerable levels at this point. We are making progress as indicated. But technical and manufacturing problems can and will continue to arise, I believe. We will continue to do our best to fix them. I am happy to expand on any of these points and to answer questions from the Committee.

Thank you, Mr. Chairman.

[The prepared statement of Vice Admiral Lautenbacher follows:]

PREPARED STATEMENT OF VICE ADMIRAL CONRAD C. LAUTENBACHER, JR. (U.S. NAVY, RET.)

Introduction

Mr. Chairman and Members of the Subcommittee, I am Conrad C. Lautenbacher, Jr., Under Secretary for Oceans and Atmosphere and Administrator of the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce (DOC). I appreciate having the opportunity to provide an update of our progress in the development of the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Program and discuss the latest Government Accountability Office (GAO) report on the program. I will provide an update on the Program since the June 7, 2007, hearing that reviewed the status of the restructured NPOESS Program.

NOAA's environmental satellite programs are the backbone of the Nation's hurricane and severe weather forecasting and warning capabilities. The 30-year record of NOAA's environmental satellites to the global climate record is also well known. NOAA's two major satellite programs each play critical roles in providing environmental information to the Nation. NOAA's Geostationary Operational Environmental Satellite (GOES) series is used for short-term weather forecasting and severe storm tracking, while NOAA's Polar-orbiting Operational Environmental Satellite (POES) series provides information that is crucial to long-term weather predictions and climate modeling. In early 2009, NOAA N–Prime, the last of the current NOAA POES series, will be launched.

Status of the NPOESS Program

NOAA's satellite acquisitions are complex and difficult development efforts. I will be the first to acknowledge that the government does not have a strong track record with regard to recent satellite acquisition development efforts. Through partnerships with the National Aeronautics and Space Administration (NASA) and the Department of Defense (DOD), and our contracts with industry, we have built and are

reinforcing our team to successfully complete NPOESS satellite development. We appreciate GAO's long-standing review of the NPOESS Program and the guidance and oversight we have derived from it. NOAA is working hard to develop our satellite programs within established cost and schedule boundaries, and with the performance that the Nation requires and expects.

The NPOESS program is funded equally (50:50) by DOC/NOAA and DOD/Air Force annual appropriations. NASA conducts NPOESS Preparatory Project (NPP) risk reduction and data continuity activities, DOD/Air Force manages the acquisition contract, and DOC/NOAA provides overall program management and operation of the system. Through FY 2008, the NPOESS program will have incurred combined program costs of $4.4 billion. The President's FY 2009 Budget request for the NPOESS Program is $577 million; of that amount, $288 million is requested for DOC/NOAA, and $289 million for DOD/Air Force.

Since the NPOESS Program's restructure and the contract renegotiation, we have completed a number of management changes that have improved oversight:

- Mr. Dan Stockton was selected as the new Program Executive Officer by NOAA with the concurrence of the NPOESS Executive Committee (EXCOM).
- Colonel Ed Phillips was recently selected as System Program Director. He currently serves as the acting System Program Director. Prior to that, he was the NPOESS Deputy Program Executive Officer.
- A restructured NPOESS contract is in place that ties contractor compensation to more objective measures of cost, schedule, and performance.
- The government has replaced the old award fee structure with a clearer performance-based structure.
- The Chief Executive Officers of Northrop Grumman and Raytheon now attend the regularly scheduled NPOESS EXCOM meetings to ensure that the appropriate resources of these corporations are focused on the development and test issues of the program.
- Several key climate sensors have been remanifested (or reinstated) on the NPP and NPOESS satellites.
- A lower risk alternative to the Conical-scanned Microwave Imager/Sounder (CMIS), the Microwave Imager/Sounder (MIS), is being developed by the Naval Research Laboratory. The MIS will be flown on the second (C–2) and third (C–3) NPOESS satellites.
- The current suite of instruments listed in Appendix 1 reflects the progress the government has made since 2006 to continue weather and climate measurements.

As a part of the future planning for the program, the NPOESS Integrated Program Office (IPO) has begun the Alternative Management Study which will develop the options and assessments for viable competing management structures for the NPOESS program. The Alternative Management Study will support future acquisition strategies for the EXCOM consideration.

A few of the NPOESS instruments continue to face challenges, but with the Program Managers and Systems Engineers who are now in place, I and the NPOESS EXCOM believe that the Program is better positioned to proactively identify, contain, and manage these challenges as they arise.

The table below lists the instruments on NPP and the C–1 satellite.

NPOESS Preparatory Project (NPP) Launch: 2010	NPOESS C-1 Launch: 2013
Visible/Infrared Imager Radiometer Suite (VIIRS)	VIIRS
Cross track Infrared Sounder (CrIS)	CrIS
Advanced Technology Microwave Sounder (ATMS)	ATMS
Ozone Mapper/Profiler Suite (OMPS) Nadir and Limb	OMPS (Nadir)
Clouds and Earth's Radiant Energy System (CERES)	CERES
	Total Solar Irradiance Sensor (TSIS)
	Space Environment Monitor (SEM)
	Search and Rescue (SARSAT)
	Advanced Data Collection System (A-DCS)

The Visible/Infrared Imager/Radiometer Suite (VIIRS) continues to be our most challenging instrument to develop, and as such receives a great deal of management and oversight by the government and NPOESS contractor team. We have implemented a number of changes based on the lessons learned during the events that lead to the 2006 restructuring of the Program and on the issues we have encountered since then. The tri-agency partners have instituted rigorous management and engineering reviews to address and resolve problems in an orderly fashion, while at the same time not posing undue risk to the overall Program. With respect to the current challenges with the VIIRS instrument, the Program Executive Officer and System Program Director, with assistance from NASA, are working with the NPOESS contractors to focus the appropriate attention and resources to address the VIIRS development challenges.

As the Committee recently learned, the NPOESS program uncovered some potentially significant fastener design flaws with VIIRS in the past few weeks. Although we are cautiously optimistic that technical assessments will result in minimal impact, the worst case scenario could cause a several month delay to the delivery of VIIRS to NPP, which could lead to a further launch delay for NPP.

The Cross-track Infrared Sounder (CrIS) is undergoing extensive planning and preparation for final sensor checklist items to be complete in time for delivery for NPP integration at the end of July 2008. The Ozone Mapping and Profiler Suite (OMPS)-Limb and -Nadir instruments that will fly on NPP have been integrated and a test of the sensors has been completed.

With respect to the ground system, the IPO continues to make progress on "SafetyNet," a system of globally distributed ground data reception stations that will receive data from NPOESS satellites and immediately relay these data to the four Weather Centrals—NOAA/National Environmental Satellite, Data and Information Service; Air Force Weather Agency; Fleet Numerical Meteorology and Oceanography Center; and Naval Oceanographic Office. The SafetyNet agreements are on schedule and there are no outstanding obstacles that would prevent completing the global ground system network.

Development of the Integrated Data Processing Segment (IDPS) continues on-track. The IDPS will process environmental data products beginning with the NPOESS Preparatory Project (NPP) and continuing through the lifetime of the NPOESS system. The IDPS must process a data volume significantly greater than the current POES and DMSP systems and within significantly reduced processing times. The IDPS recently completed factory acceptance test readiness review.

Coordination of Tri-agency Acquisition Decision Memoranda

The IPO continues to coordinate among the tri-agency partners, DOD/Air Force, NASA, and DOC/NOAA, to conclude and finalize the documents required by the June 2006 Acquisition Decision Memorandum. Six documents remain to be completed. While getting these remaining documents finalized has not hindered our ability to manage and implement the NPOESS Program thus far, they have been challenging to coordinate through a tri-agency process. However, the EXCOM re-

mains committed to completing them. At this time, the six outstanding documents are the:

- Fee Management Plan
- Acquisition Program Baseline
- Acquisition Strategy Report
- Test and Evaluation Master Plan
- Two-Orbit Program
- NPOESS Tri-Agency Memorandum of Agreement

The program is working to secure final clearance on the documents by later this year.

Status of Restoring Key Climate Sensors

As discussed earlier, the 2006 decision to restructure the NPOESS Program removed (or "demanifested") several planned sensors that would have sustained key, long-standing climate measurements. The table in Appendix 2 lists the current status of those demanifested sensors. Since this decision, Office of Science Technology Policy (OSTP) and the Office of Management and Budget have worked closely with NASA and NOAA and the climate science community to understand the implications of the loss of these climate sensors for climate and ocean research activities, and to identify options for retaining key measurement capabilities from this group of planned sensors.

As a result of these assessments and information provided in the *2007 National Research Council Decadal Survey on Earth Sciences,* the Administration concluded that the highest near-term priorities (listed in relative priority order) are to sustain the data sets of the following five key climate measurement capabilities:

- Total solar irradiance
- Earth radiation budget
- RADAR altimetry
- Ozone vertical profile
- Aerosols

In addition to continuing these critical measurements, the Administration also recognized the importance of stewardship of the climate data records that will be derived from these instruments.

The Administration developed a plan to implement this assessment and requested a $74 million budget initiative in the President's FY 2009 Budget Request. These funds will be used to support the development of CERES and TSIS in time for their respective launches on NPP and C–1. Specifically, the FY 2009 funds would be applied to the development of the sensors in the following manner:

- $38 million for development of CERES for NPP and C–1, which will provide continuity for Earth radiation budget measurements,
- $28 million for development of TSIS for C–1, which will provide continuity for total solar irradiance measurements, and
- $8.0 million for development of data record stewardship to provide long-term science support for the data derived from climate instruments.

This plan complies with the 2006 restructure of the NPOESS Program that requires sensors be restored only if they are funded separately from the joint DOC/NOAA–DOD/Air Force annual appropriations for NPOESS. In this plan, NOAA is responsible for full funding to develop these instruments with NASA providing technical and acquisition assistance on a cost reimbursable basis from NOAA.

The plan includes two of the five key measurements detailed in the priority list above. NOAA and NASA have determined that near-term continuity of the other three measurements can be fulfilled through existing plans detailed below:

- Continuity of RADAR altimetry measurements can be fulfilled through the Jason 2 mission scheduled for launch this month. Plans for a follow-on satellite (Jason 3) are currently being evaluated.
- Aerosol measurements can be fulfilled with the 2009 launch of the Aerosol Polarimeter Sensor on the NASA GLORY mission.
- Ozone vertical profile data requirements can be addressed by the NPOESS EXCOM's 2007 decision to remanifest Ozone Mapping and Profiler Suite Limb sensor (OMPS–Limb) with the OMPS–Nadir sensor onto NPP.

While these efforts address the most immediate needs for climate sensor continuity, it is recognized that a longer-term strategy for climate sensor continuity must also be addressed. NOAA and NASA are continuing to work together to identify the longer-term strategy, taking into account current and future national and international assets. The results of these efforts will continue to be vetted with the science community and reflected in outyear budget recommendations.

Status of Demanifested Space Weather Sensors

In addition to the climate sensors discussed above, the Space Environmental Sensor Suite, which includes five space weather sensors, was demanifested from the NPOESS program in 2006. In June 2007, OSTP requested that the Office of the Federal Coordinator for Meteorology convene an interagency group to provide an assessment of the impact of demanifesting these space weather sensors. NOAA, NASA, and the Air Force participated in this assessment. The assessment and report focused on evaluating whether and how to restore these space weather measurements in a two phase approach:

Phase I: Assess the impacts of the 2006 NPOESS restructure decisions and the potential loss of NASA's Advanced Composition Explorer (ACE) mission on U.S. space weather-related activities.

Phase II: Examine possible options to address these impacts and to restore the capability lost.

The Phase I report was provided to OSTP earlier this year. The main findings were that the 2006 restructuring of the NPOESS program:

- reduced support of Environmental Data Records from 12 to 5,
- may cause monitoring and warning capabilities to revert to pre-1980 levels, and
- put precision Global Positioning System (GPS) users at risk.

Additionally, the loss of NASA's ACE data was deemed critical as it would eliminate the ability to predict the onset of geomagnetic storms. At this time, NASA has instituted a fuel management strategy that may allow ACE to continue to perform until 2020. However, since there is no ACE replacement in development, this single source of data remains an area of concern for NOAA and the space weather community. While OSTP has not formally initiated Phase II of the assessment, it is expected to do so later this year.

In addition, the Committee was informed last month that NOAA is currently working to mitigate the loss of some space weather observation capabilities on three of four of its on-orbit geostationary satellites. NOAA is currently relying on GOES–10, the oldest geostationary satellite on orbit, to monitor solar flares, an observation important to users of satellite and high frequency communications and GPS. Plans for future mitigation following the end of the satellite's service are being planned in partnership with NASA.

Government Accountability Office (GAO) Recommendations for Executive Action

GAO has provided regular reviews of the NPOESS Program and we appreciate the perspective GAO professionals provide. We have met with GAO and provided information and feedback on its most recent report and believe that existing efforts underway will support the closure of these recommendations.

Recommendation number one: *In order to bring closure to efforts that have been underway for years, we are making recommendations to the Secretaries of Commerce and Defense and to the Administrator of NASA to establish plans on whether and how to restore the climate and space sensors removed from the NPOESS Program by June 2009, in cases where the sensors are warranted and justified.*

NOAA concurs with the recommendation and continues to work with OSTP, OMB, NASA, and the climate science community to restore the climate sensors that were demanifested from the NPOESS Program in 2006. While the NPOESS Program continues to face challenges, the tri-agency NPOESS EXCOM, on the advice of the NPOESS Program Executive Officer, approved remanifesting OMPS–Limb and CERES onto NPP, and remanifesting TSIS onto the first NPOESS C–1 satellite. Meeting the required deadlines to integrate these instruments onto NPP and NPOESS C–1 requires full funding of the DOC/NOAA and DOD/Air Force NPOESS Program, and the NOAA climate sensor and climate data record budget requests. An FY 2009 continuing resolution that did not provide full funding for the $74 mil-

lion for climate sensors would threaten the development of the TSIS and CERES sensors and potentially put into question whether they would be ready for integration onto the NPOESS C–1 mission. Restoration of the other measurements will occur in the later years, as previously discussed.

Restoration of the space weather sensors is being modeled after the collaborative interagency process with OSTP and OMB that was used to assess the demanifested climate sensors. NOAA continues to work closely with user communities affected by space weather to ensure that its plans address user requirements. NOAA is also working closely with NASA to maximize the utility of the ACE satellite. In the interim, NOAA has requested input from the aerospace industry and several suggested concepts and proposals are being evaluated as potential commercial opportunities for data purchases, secondary payload opportunities, and commercially provided satellites to meet projected NOAA observational requirements.

Recommendation number two: *In addition, we are reemphasizing our prior recommendation that the appropriate NASA, NOAA, DOD executives immediately finalize key acquisition documents.*

NOAA concurs with this recommendation and has been working with the tri-agency NPOESS EXCOM to reach the agreements required to complete the six outstanding Acquisition Decision Memorandum documents. Recently, the Under Secretary of Defense for Acquisition, Technology, and Logistics issued an extension until August 2008 to complete the documents. The NPOESS Program Executive Officer has made completing this task one of his top priorities and the EXCOM Principals and their staffs are supporting his efforts.

Conclusion

In conclusion, I appreciate the Committee's continued interest in the success of NOAA's satellite programs. It is widely acknowledged that satellites are very complicated and difficult systems to design, build, and operate. However, their capabilities play a key role in NOAA's mission to observe and predict the Earth's environment and to provide critical information used in protecting life and property.

We are making significant strides in developing better processes for designing and acquiring our satellites. We currently have well functioning operational satellites with backup systems in place, and we are working on the next generation that will provide significant improvements in our ability to forecast the weather and monitor the climate. I would be happy to answer any questions you may have.

Appendix 1 NPOESS Instruments
(as of June 2008)

Instrument	Function	Status
Visible Infrared Imager/Radiometer Suite (VIIRS)	Collects visible infrared data of the Earth's atmosphere, ocean, and land such as clouds, snow, ice, and sea surface temperature	In Development
Crosstrack Infrared Sounder (CrIS)	Measures vertical distribution of temperature, moisture, and pressure in the atmosphere	In Development
Ozone Mapping and Profiler Suite (OMPS)	Collects data on distribution of ozone in the Earth's atmosphere	In Development
Advanced Data Collection System (ADCS)	Collects and redistributes data from remote sites. Monitors species migration	Government Furnished Equipment (GFE) instrument to IPO
Cloud and Earth's Radiant Energy System (CERES)	Measures both solar-reflected and Earth-emitted radiation from the top of the atmosphere to the Earth's surface	In Development
Advanced Technology Microwave Sounder (ATMS)	Senses data on temperature and moisture profiles	In Development
Space Environment Monitor (SEM)	Collects data on the space environment	Development to begin in FY 2008
Search and Rescue Satellite Aided Tracking (SARSAT)	Detects and locates aviators, mariners, and land-based users in distress	GFE instrument to IPO
Microwave Imager/Sounder (MIS)	Measures atmospheric temperature and pressure, and the velocity and direction of the ocean and wind currents	Development to begin in FY 2008
Total Solar Irradiance Sensor (TSIS)	Measures total and spectral density of solar radiation on the earth	Development to begin in FY 2009. GFE instrument to IPO

Appendix 2
Status Of The Climate Sensors Demanifested During 2006 Restructuring of the NPOESS Program

Sensor	Current Status
Aerosol Polarimetry Sensor (APS)	NASA is developing an APS instrument which is scheduled to be launched on the GLORY mission. APS has experienced developmental challenges that have delayed the launch date from December 2008 to 2009. NOAA is monitoring that developmental process closely before making a decision to move forward on this sensor.
RADAR Altimeter	Ocean Surface Topography Mission on the Jason-2 satellite (OSTM/Jason-2) is scheduled for launch in June 2008. OSTM/Jason-2 will continue satellite altimetry measurements from the Jason mission. NOAA, NASA, the French Space Agency (CNES), and EUMETSAT are collaborating to provide operational support for Jason-2. NOAA will support data processing, archiving and distribution of products that its users require. NOAA is evaluating options for operational continuity for altimetry data with a satellite follow-on (Jason 3). Details are still being negotiated.
Survivability Sensor	This sensor was specific to Department of Defense requirements, and is not a priority for NOAA. NOAA is not pursuing this instrument.
Total Solar Irradiance Sensor	TSIS measurements are important to NOAA. Development of the TSIS instrument is the most immediate priority. The NPOESS Executive Committee (EXCOM) recently decided to place the TSIS instrument on C1, the first NPOESS satellite.
Conical-scanned Microwave Imager/Sounder (CMIS)	The NPOESS Integrated Program Office (IPO) recently announced a partnership with the U.S. Naval Research Laboratory (NRL) to develop the first MIS sensor. The NRL plans to move production of additional MIS sensors for subsequent NPOESS launches to an industry partner, should this prove more cost-effective.
Earth Radiation Budget Sensor	The EXCOM recently decided to place the Clouds and the Earth's Radiant Energy System (CERES) instrument on the NPOESS Preparatory Project. This will assure continuity of measurements between NASA research satellites and first NPOESS spacecraft's CERES instrument.
Ozone Mapper/Profiler Suite (OMPS)	In April 2007, NOAA and NASA jointly announced that it would add the OMPS-Limb portion of the sensor back to the OMPS-Nadir portion on NPP.
Space Environmental Sensor Suite	The White House Office of Science Technology Policy is working with NOAA, NASA and DoD to study various options to acquire these data.

BIOGRAPHY FOR VICE ADMIRAL CONRAD C. LAUTENBACHER, JR., NAVY (RET.)

A native of Philadelphia, Pa., retired Navy Vice Admiral Conrad C. Lautenbacher, Ph.D., is serving as the Under Secretary of Commerce for Oceans and Atmosphere. He was appointed Dec. 19, 2001. Along with this title comes the added distinction of serving as the eighth Administrator of the National Oceanic and Atmospheric Administration. He holds an M.S. and Ph.D. from Harvard University in applied mathematics.

Lautenbacher oversees the day-to-day functions of NOAA, as well as laying out its strategic and operational future. The agency manages an annual budget of $4 billion. The agency includes, and is comprised of, the National Environmental Satellite, Data and Information Services; National Marine Fisheries Service; National Ocean Service; National Weather Service; Oceanic and Atmospheric Research; Marine and Aviation Operations; and the NOAA Corps, the Nation's seventh uniformed service. He directed an extensive review and reorganization of the NOAA corporate structure to meet the environmental challenges of the 21st century.

As the NOAA administrator, Lautenbacher spearheaded the first-ever Earth Observation Summit, which hosted ministerial-level representation from several dozen of the world's nations in Washington July 2003. Through subsequent international summits and working groups, he worked to encourage world scientific and policy leaders to work toward a common goal of building a sustained Global Earth Observation System of Systems (GEOSS) that would collect and disseminate data, information and models to stakeholders and decision-makers for the benefit of all nations individually and the world community collectively. The effort culminated in an agreement for a 10-year implementation plan for GEOSS reached by the 55 member countries of the Group on Earth Observations at the Third Observation Summit held in Brussels February 2005.

He also has headed numerous delegations at international governmental summits and conferences around the world, including the U.S. delegation to 2002 Asia-Pacific Economic Cooperation Ocean Ministerial Meeting in Korea, and 2002 and 2003 meetings of the World Meteorological Organization and Intergovernmental Oceanographic Commission in Switzerland and France, as well as leading the Commerce delegation to the 2002 World Summit on Sustainable Development in South Africa.

Before joining NOAA, Lautenbacher formed his own management consultant business, and worked principally for Technology, Strategies & Alliances Inc. He was president and CEO of the Consortium for Oceanographic Research and Education (CORE). This not-for-profit organization has a membership of 76 institutions of higher learning and a mission to increase basic knowledge and public support across the spectrum of ocean sciences.

Lautenbacher is a graduate of the U.S. Naval Academy (Class of 1964), and has won accolades for his performance in a broad range of operational, command and staff positions both ashore and afloat. He retired after 40 years of service in the Navy. His military career was marked by skilled fiscal management and significant improvements in operations through performance-based evaluations of processes.

During his time in the Navy, he was selected as a Federal Executive Fellow and served at the Brookings Institution. He served as a guest lecturer on numerous occasions at the Naval War College, the Army War College, the Air War College, The Fletcher School of Diplomacy, and the components of the National Defense University.

His Navy experience includes tours as Commanding Officer of USS HEWITT (DD–966), Commander Naval Station Norfolk; Commander of Cruiser-Destroyer Group Five with additional duties as Commander U.S. Naval Forces Central Command Riyadh during Operations Desert Shield and Desert Storm, where he was in charge of Navy planning and participation in the air campaign. As Commander U.S. Third Fleet, he introduced joint training to the Pacific with the initiation of the first West Coast Joint Task Force Training Exercises (JTFEXs).

A leader in the introduction of cutting-edge information technology, he pioneered the use of information technology to mount large-scale operations using sea-based command and control. As Assistant for Strategy with the Chief of Naval Operations Executive Panel, and Program Planning Branch Head in the Navy Program Planning Directorate, he continued to hone his analytic skills resulting in designation as a specialist both in Operations Analysis and Financial Management. During his final tour of duty, he served as Deputy Chief of Naval Operations (Resources, Warfare Requirements and Assessments) in charge of Navy programs and budget.

Lautenbacher lives in Northern Virginia with his wife Susan who is a life-long high school and middle school science teacher.

DISCUSSION

EXECUTIVE COMMITTEE PERFORMANCE

Chairman LAMPSON. Thank you, Admiral Lautenbacher. Let us start with Mr. Powner and then go to the discussion about the Executive Committee. This committee has been told that the Executive Committee represents the group responsible for the top decisions in the NPOESS program. We have had many concerns about the EXCOM performance. You have seen the EXCOM in operation. What, to you, explains the repeated difficulty in getting decisions made on the NPOESS issues?

Mr. POWNER. Mr. Chairman, I think when we look at these key acquisition documents, the one area where we want to fault the program is the Executive Committee. The Executive Committee was put in place to ensure that we work appropriately across organizational boundaries. We have different cultures, we have different bureaucratic processes. We are running into that, but that is still no excuse. The Executive Committee needs to step up and to ensure that these key acquisition documents get signed. I think the threat from DOD is not a bad thing given that we now have this August deadline to get these signed, but DOD is equally at fault here. I mean, almost every one of the documents they mention in their memo are waiting approval at DOD.

Chairman LAMPSON. At just the one agency, Department of Defense?

Mr. POWNER. No, there is also—we had information as of two days ago, and there were still some documents in the Department of Commerce that needed approval also. So we have multiple organizations that need to agree to these documents and to ensure that they get signed off so that we can move forward. And it is key that we have interagency agreement here. And one of these documents is the approved baseline. You know, there is a fundamental question about what baseline are we working off and when are we going to start the clock ticking for perhaps, you know, measurement for the next Nunn-McCurdy decision. Right now, we don't have a baseline that we are marching off of right now.

Chairman LAMPSON. Is it the individuals who sit on the Committee or is it the culture of the agencies that is preventing the individuals who are sitting on the Committee from being able to make these decisions?

Mr. POWNER. Both. I think the individuals on the Executive Committee were put in place to work within their organizations, but clearly, I am sure the Admiral would agree, there are individuals above him at both organizations where there has been a hang-up. But still, that is no excuse for the Executive Committee not to step up and work upwards to get these key documents approved.

Chairman LAMPSON. Admiral, in the period leading up to the Nunn-McCurdy restructuring of NPOESS, this committee examined a good bit of the communications that went from the Integrated Program Office to the EXCOM. We became concerned because it appeared that at a time when the program needed firm leadership, the EXCOM regularly postponed decisions, if it met at all. The Department's Inspector General determined that the EXCOM did not challenge optimistic statements by the program

manager even as the VIIRS instrument fell further behind schedule and grew in cost. You testified to the Committee at a hearing two years ago that there would be quarterly EXCOM meetings, and you "insisted that management processes must be made more transparent and auditable and strengthened at all levels." Has the Executive Committee reverted to their old habits?

Vice Admiral LAUTENBACHER. No, we have not. There has been significant changes made in the process as a result of the Nunn-McCurdy review and the steps that we actually took before the Nunn-McCurdy review began. I am happy to go through—we have agreed and we have bent schedules and made sure that we have had quarterly meetings, whether we needed one or not. They are auditable, they are trackable, and I am happy to provide the record of all the decisions that were made. There have been nine EXCOMs since that particular meeting. There have been over 40 decisions made to ensure this program stays on track in a timely and meaningful manner. There have been dozens of phone calls and personal interactions to deal with this. This is a program that in my experience in 40 years of working in the Navy and seven years, I have never seen this level of detail and involvement at the agency-head level in the individual management of a program that is taking place in NPOESS. So this is providing—we have provided a baseline for continual dialogue. It still is a difficult program to manage because of the three agencies. You mentioned the culture before. But I want to iterate that the issue with this program is not necessarily the management structure at this point, it is contractor performance on a particular instrument called VIIRS, and that is where we are focusing our attention and that is the issue that needs to be solved to make this program come around and be on schedule and meet the needs. And we are focused intently on getting that system in place.

Chairman LAMPSON. Do you agree with that, Mr. Powner, that that is the primary or the single——

Mr. POWNER. I agree that the performance of VIIRS is the largest question mark on this program. However, the threat to withholding funding with these documents not being signed is a big issue. If in fact funds are withheld for fiscal year 2009, it has a devastating affect because of the matching that needs to occur with the NOAA funding portion. So I agree that VIIRS is the number one problem in contractor performance, but now that we got this new wrinkle with DOD throwing in the threat to withhold funding, this is a big deal.

Chairman LAMPSON. Okay. My time is up in just a few seconds, so I am going to hold my question for a minute, and I will now recognize the Ranking Member, Mr. Inglis for five minutes.

CONTINUITY CONCERNS

Mr. INGLIS. Thank you, Mr. Chairman. A couple of key questions. I suppose one is cost which you have been discussing. The other is continuity, and Admiral, you are confident that we have got continuity in spite of this delay, is that correct?

Vice Admiral LAUTENBACHER. Yes, I am confident we have the continuity. There has been a delay in NPP, but the systems that are in place today, and the N–Prime satellite which has not been

launched yet, which will be launched after next year, will last long enough to cover the gap. There has been no effect on the C–1 launch. So the satellites that we have to launch to have available for coverage are sufficient to cover the time until the C–1 instruments are launched in 2013.

Mr. INGLIS. At some point we start getting, if we try to cross this intersection, we get to a yellow light and in squeezing the orange here at some point we are going to get the red light. So when is the—we are still safely—it is a green light, is that right? We are not even in the yellow yet?

Vice Admiral LAUTENBACHER. We are still safely in the green light given the Nunn-McCurdy review that we had. Remember, we had to delay the program because of the initial manufacturing problems with the VIIRS instruments. This instrument has experienced problems across the whole, and let me say that versus what the EXCOM has been doing, that I have been personally on this VIIRS issue since I took over this job and have been beating up on the contractors and the program office to deal with VIIRS. So it is not an unknown problem to the EXCOM, and the EXCOM has been involved in working on trying to resolve problems with VIIRS for a long, long time. So it is not an issue that there is absentee management from a government perspective on the issue.

But given that statement, the change in the delay of NPP will not affect the continuity of our system at this point. There is sufficient overlap of the satellites that we have in orbit and stocked up to continue our coverage as we have today.

Mr. INGLIS. Mr. Powner, does GAO agree as we approach this continuity intersection, the light is still green, we are not running the yellow yet or——

Mr. POWNER. Yeah, we would agree with that. I think the key deadlines of NPP now is a June 2010 date, and then C–1 is January 2013. If those start to slip, then it is another story and there is a new ball game here.

The other thing, too, is if NPP would slip—that was a demonstration satellite that we were to learn and incorporate that into further builds. So if that would happen to slip, you lose that opportunity to incorporate those lessons learned.

Mr. INGLIS. So this is good news in that we are—it is a very important project that is going to provide important data for military and civilian purposes. So we have got continuity covered, and that is good.

How about—it seems a little bit funny for DOD to—maybe a good defense is a good offense—no, a good offense is a good defense I guess is what it is. Maybe what they are trying to do is just—if they have the documents and they are not working, not moving them, then what is the deal on that? Anybody got an observation about why they are being critical even though they may be holding the documents?

Vice Admiral LAUTENBACHER. If I could respond for a minute, I have been very vocal,k publicly and privately, about the need to get these documents done. And I expressed to DOD that I would like some help in getting these things signed because many of the issues that need to be resolved are at offices that are above my pay grade. And so this is one of the results of that; these kinds—I don't

want to call it a threat but I am hoping there is enough attention. I do not believe this is an EXCOM issue directly, although we are responsible for it and I am going to work this until the last "i" is dotted and "t" is crossed on it. But we are not lacking from the EXCOM perspective in trying to press the system to sign off on these documents.

And I would tell you that the progress that we have made, what is left to deal with on these documents is not critical to making progress on this program. I can go through each one of these documents and explain that to you if you wish at this point. But we have created—16 of these documents, are signed, delivered, and working. We have a full schedule, we have a contract signed, we have monitors in progress, we have earned value, we have all of the pieces that we need to make progress day-to-day on this program and meet schedules. What is left are important documents. They need to be signed, and I don't disagree with that; and I am going to work extremely hard to try to make this deadline, and I am pleased that Mr. Young is interested in making a deadline, too. I called their office this morning to make sure they were on-board with this, and that is the word I got back. So I hope with this incentive there would be more pressure to move the final wording, and there are only a few small points that are left from these documents to deal with.

Mr. INGLIS. My time has expired. Thank you, Mr. Chairman.

Chairman LAMPSON. Thank you, Mr. Inglis. And I recognize Mr. McNerney for five minutes.

Mr. MCNERNEY. Thank you, Mr. Chairman. Admiral, one of the things that you said that really stuck me was that you have never seen agency-head involvement at this level of detail. Now, my experience in industry is when management gets involved in the details, it has a tendency to make things worse, and I certainly think there is an opportunity for that here. What is your opinion on that?

Vice Admiral LAUTENBACHER. I think that is a good observation, and I have tried to be careful to do this in a way to not undercut the expertise and the value of the people put in place to make the decisions at the right level. I have been involved in this business for a long time, too. I came to Washington in 1971, I have been an independent cost estimator, I have run programs, I have been a budgeteer, I have looked at management oversight over a wide variety of programs in the Navy, and I am very sensitive to the comment that you just made. When I say being involved, what I am talking about is being briefed and being cognizant of it, making sure that as we make decisions we know as much in depth as possible in the time allotted to do it. I have not tried to interfere. I can't speak for my contemporaries, but I have not tried to interfere in micro-management that I believe would be counterproductive to the smooth operation of the program.

Mr. MCNERNEY. Well, you just said you weren't involved in micro-management, but does the progress with the documents, is that also taking place at the highest levels——

Vice Admiral LAUTENBACHER. It is.

Mr. MCNERNEY.—of the agency?

Vice Admiral LAUTENBACHER. It is. Well, first of all, I brief the Deputy Secretary of Commerce every week on the full status of this

program, including the documents. I also have, internal to my organization, the Program Management Council, with my Chief Operating Officer, that goes through the status at least monthly. I go through a monthly full up-status with my staff on what is going on. So I understand what is happening, and I push people when they need to be pushed and I try to keep this working. Otherwise, we wouldn't have gotten the 16 of the 22 signed that we have or be as close as we are on the last six.

THE VIIRS SENSOR

Mr. MCNERNEY. Thank you. As a scientist, I want to ask a little bit about the VIIRS sensor, but I am afraid I am going to run out of time before you could give me a good explanation of that. You mentioned that you got a call last night that indicated that that was going to be deliverable on time now.

Vice Admiral LAUTENBACHER. Yes, sir.

Mr. MCNERNEY. How confident are you of that result, of that information?

Vice Admiral LAUTENBACHER. As with all information that comes in without sufficient time to sit on it and to look at it and examine it, I always reserve the right to make sure that it is correct. We have asked for a full court press obviously in this particular issue because I view it as a serious one to look at what needs to be done to ensure that the fasteners are correctly in place and will maintain the integrity during the testing phase which is where we are now. A full court press was put on, day and night, looking—we sent our own people out there as well as—when I say, government people as well as the manufacturer's people, to look at it, and this is the report. We asked them to do it as quickly as possible because we reported to the Committee and I wanted to have an answer today for you on where we stand on that, sir.

Mr. MCNERNEY. Mr. Powner, do you share his level of confidence with regard to the delivery of that sensor?

Mr. POWNER. This is new information for us in terms of with the latest problem. The concern with VIIRS is this: every time you turn around and look at VIIRS, there is another manufacturing or technical problem, and there has been a history of that. So I think we are far from being out of the woods on VIIRS, and it still is the number one concern on this program.

Mr. MCNERNEY. Thank you. I yield back.

Chairman LAMPSON. Thank you, Mr. McNerney. Dr. Bartlett, you are recognized for five minutes.

THE GAP BETWEEN SATELLITE LAUNCHES

Mr. BARTLETT. Thank you very much. A couple of years ago, Admiral, when we had an oversight Subcommittee hearing on this issue, there was some major concern that the delays in launching these satellites were going to result in a lapse of coverage. What has happened to fill that gap?

Vice Admiral LAUTENBACHER. Obviously we have come down the road more than two years now. The satellite launches that we have scheduled for continuity have worked basically, so we have two years more of experience that we have satellites in orbit that are

operating and providing us the information. So we have more confidence because we actually have hardware in the air that is functioning. So issues that could have caused an absence of information coming from space have been covered by the fact that we have been successful in the program that we predicted we would be able to execute two years ago.

Mr. BARTLETT. There are two general reasons for the delays here. One is the coordination difficulties with this tri-agency. The other is that we have done here what we so often do in DOD and that is that we push the envelope, and we never come to the point that says this is good enough. We have really pretty good weather data that has been coming in now for a number of years. Which of these has been the primary reason for the problems here? Has it been the difficulties coordinating three very different agencies or has it been that we just were too optimistic about what could be done with this technology?

Vice Admiral LAUTENBACHER. I believe it is the latter, sir. I believe that we have been optimistic about the technology. The VIIRS instrument, for instance, was supposed to be modeled after the MODIS[8] instrument, which was an R&D instrument that has been working in space as an R&D instrument, not as an operational instrument. And people felt that, well, if we did this much with MODIS, we could do this much with VIIRS; and we already sort of built MODIS, so let us build a bigger VIIRS. It hasn't been tested, so it is a new instrument and it is having the same issues that we always have when we try to develop something new. I have been a proponent of doing more testing and incremental approaches to our capability to ensure that we have continuity, and I think that is why we are where we are. That is one of the prime reasons we are where we are.

Mr. BARTLETT. It is axiomatic, I think, that industry is going to be perhaps overly optimistic about what they can do because they are in the mode of selling, and they are going to win if they promise more. And frequently they promise more than can be realistically delivered. I worked for five years for an agency in the Navy that was kind of an honest broker. That was at the Johns Hopkins University Applied Physics Lab, and that lab never competes with industry so industries share their deepest proprietary secrets. But what the lab does is to tell the Navy, now more broadly the military and NASA, this is probably going to work, this is probably not going to work.

For programs like this, who do we have to turn to ask them, is it realistic to expect that industry really can do what they promised to do?

Vice Admiral LAUTENBACHER. We have the ability to go to a number of the FFRDCs[9] or independent—we go—John Hopkins is obviously a place where we can go, and we have used John Hopkins to help NOAA. I won't speak for the other agencies that are involved here. And we also use the Aerospace Corporation. We use Noblis company to deal with some of these issues. NOAA uses independent advice to look at the feasibility of moving it into the fu-

[8] Moderate Resolution Imaging Spectroradiometer
[9] Federally-Funded Research and Development Centers

ture. Now, I want to say your question is a very important one. With one of the issues that the decisions that were made was to delay what is called the CMIS[10] or the MIS[11] instrument because we believe it was exactly the same problem we would have with VIIRS. So we delayed that instrument. What we are doing with that instrument—so we revised the specs on it. We are engaging—we had competition, if you want to call it that, with FFRDCs to give us the best proposal to design something that would work, based on technology that has already been proven, and the Naval Research Laboratory—NRL—is now building a prototype for us which will transfer the technology to an industry partner to build it with hopefully a lot less risk and more assurity that when that instrument goes on C–2, it will work and it will be within cost and schedule. So I think your comments are very pertinent.

Mr. BARTLETT. Thank you. Thank you, Mr. Chairman.

MORE ON THE EXECUTIVE COMMITTEE'S PERFORMANCE

Chairman LAMPSON. Thank you, Dr. Bartlett. The Chair will recognize himself for the next five minutes.

Admiral, the Committee appreciates receiving the presentation on the alternative management study which your staff was kind enough to send us last night at 10:24. I note that the team convened to evaluate changes said this, "EXCOM is too senior to provide the routine immediate assistance often needed at this stage of a program." That seems to say that EXCOM isn't adding any value to the NPOESS management. Can you comment on that, please? Would you agree?

Vice Admiral LAUTENBACHER. Could you read—I am not sure. I would have to get the context of that. Obviously, there are many things that we probably—as brought up in the previous questioning about micro-management and various things. What is the particular reference there because I think we are—we should play in the alternative management study in terms of the strategies that are used for the future. I want to make sure I understand what you are——

Chairman LAMPSON. It is in a chart——

Vice Admiral LAUTENBACHER. Okay.

Chairman LAMPSON.—talking about the existing program structure.

Vice Admiral LAUTENBACHER. And it says?

Chairman LAMPSON. EXCOM is too senior to provide the routine immediate assistance often needed at this stage of the program.

Vice Admiral LAUTENBACHER. And I would have to look at the chart. Let me discuss the philosophy and what is involved with that and what is involved with the EXCOM.

First of all, EXCOM sounds like it is a bad title from an old science fiction movie. It is not some magic deal, it is just the agency heads. So it is the agency heads that are responsible for these programs.

Chairman LAMPSON. But it is those people who are supposed to make the management decisions to move this thing forward.

[10] Conical-Scanning Microwave Imager and Sounder
[11] Microwave Imager/Sounder

Vice Admiral LAUTENBACHER. Yes, it is, and at that level. So there is always an issue of what—and in fact, when we have had this issue of where the acquisition authority milestone ought to be in the Department of Commerce, it would be with the Secretary. Our independent review said, it probably should not be with the Secretary because he does not have the time or the ability to be able to deal at the levels needed to add value to that. So it should be at a lower level, and it came down. It was at my level that it was put.

So there are always questions as to what levels decisions should be made. We have tried to balance the decisions with the information that comes up, and you have to be careful not to micro-manage areas where you may not have enough information to be able to do it. So in this particular one, I have to go back and look at this chart to be sure. I am not sure what this chart is exactly trying to imply.

Chairman LAMPSON. Well, I would imagine that something wouldn't make it to this committee unless the lower level needed the help of that decision and couldn't go forward——

Vice Admiral LAUTENBACHER. Right.

Chairman LAMPSON.—in the event that it didn't have it. I would hope that they would be asking those things that they most critically need of the EXCOM and be able to move forward from there.

ACQUISITION DOCUMENT APPROVAL

You testified that gaining concurrence on the NPOESS acquisition documents has been challenging to coordinate through a tri-agency process. What precisely are the areas of disagreement that have stretched this process out for more than a year?

Vice Admiral LAUTENBACHER. You have to walk a mile in my moccasins before you can really understand this, and it is hard to say, "Well, why isn't this done?"

There are a number of offices in each bureaucracy that deal with this. So there are at least five big bureaucracies. There is the Department of Commerce, above my pay grade, the Department of Defense above the pay grade—above the Air Force. Then there is the Department of the Air Force. Those are big departments. They have their own lawyers, they have their own acquisition program management structures, they have their own connections with the operating forces—Space Command—that comes in and kibitzes on each one of these. Their comments come up and down these various levels, then they come across to us to see if we agree. We turn around as quickly as we can and get them back over there. So by the time you work this process——

Chairman LAMPSON. Let me interrupt. I have got less than a minute left.

Vice Admiral LAUTENBACHER. Yes, sir.

Chairman LAMPSON. Talk about some—you said you have the documents that show some of those differences.

Vice Admiral LAUTENBACHER. Yes.

Chairman LAMPSON. Tell us what——

Vice Admiral LAUTENBACHER. Let me tell you where we are. First of all, as I have said before, these documents that are not signed with the "i's" dotted and "t's" crossed yet are not holding up

progress on this program, are not affecting our ability to manage it and create the progress that we need.

Chairman LAMPSON. Okay, but give me an example of something that is.

Vice Admiral LAUTENBACHER. Okay. I'm sorry, say again?

Chairman LAMPSON. An example of something that is.

Vice Admiral LAUTENBACHER. I don't have any examples on this list that are. The seven—and if you count the alternative management study, I have already explained that we are doing an alternative management study and that is a decision to be made in 2010.

Chairman LAMPSON. What is the disagreement then in the Memorandum of Agreement?

Vice Admiral LAUTENBACHER. Okay. In the Memorandum of Agreement? In the Memorandum of Agreement, it is about trying to define the authority of the Acquisition Executive in DOD. DOD is the acquisition authority. We work under their contract rules. And this is an internal DOD issue to line up the "i's" and "t's" to make sure the lawyers—this is being massaged by lawyers at this point—to ensure that the wording is exactly correct. Now, I want to point out that the Memorandum of Agreement—there is a Memorandum of Agreement in place and we are working under it. We worked under it for the Nunn-McCurdy, and it is effective. And we follow all the rules, and we are trying to make a couple of changes to it.

Chairman LAMPSON. Okay. Does it need to be changed because of Nunn-McCurdy?

Vice Admiral LAUTENBACHER. It does. It does need——

Chairman LAMPSON. But when will it be?

Vice Admiral LAUTENBACHER. I have to defer to the Department of Defense on that. We are under the gun to do this by the end of August. I am going to do everything I can to have them get this finished.

Chairman LAMPSON. Okay. You can't force them to do it.

Vice Admiral LAUTENBACHER. I can't force——

Chairman LAMPSON. What does it take to make them do it? Do we have to take action?

Vice Admiral LAUTENBACHER. I certainly hope not. I certainly hope that there is enough——

Chairman LAMPSON. Okay. The award fee plan is awaiting the Commerce Department decision. What is the problem with that?

Vice Admiral LAUTENBACHER. It is the Fee Management Plan. First of all, award fees are done, taken care of. The Fee Management Plan—there is one concern left from NASA, and their concern is to talk about the specific issues on on-orbit performance, something way down the road. The Fee Management Plan—we have put in place a much stronger fee management plan. It has been agreed to in the contract, agreed to by—this was, remember, a complaint that we got several years ago that you are not pushing the contractor enough. So remember, that has totally changed, agreed to, and is in operation today. So that is not an issue. So the Fee Management Plan on which we are operating and forcing control by the contractor is in place. This is about something that is in the future. We expect this to be done very shortly. In fact, the word I have this

morning, like the technical issue that I mentioned, is that the concerns are done and this is ready to be signed. It will be signed today or tomorrow. I was hoping it would be signed before we got here, but it is just about done.

Chairman LAMPSON. Okay. Let me pass another round to Mr. Inglis.

Mr. INGLIS. Thank you, Mr. Chairman. Mr. Powner, do you agree with the Admiral that the documents are not likely to—the lack of the documents being signed is not holding us up at this point?

Mr. POWNER. Well, clearly, I think there are some items in those documents that are important, but what we know, a lot of these are minor issues. This is bureaucracy at its worst. I mean, these are things that need to get signed and especially now that there is a threat to future funding of the program. These are items that we need. One other thing with the EXCOM. If we have a bureaucratic process, the executives are put in place to work through the bureaucracy and to get things done. That is what executives do, whether it is below you, above you, or at your level. And so again, I just want to reiterate that I think the executives need to step up and ensure that these key documents get signed.

Mr. INGLIS. I am trying to figure out why the DOD would threaten to withdraw or threaten to not meet the payment schedule or withdraw funding. They have as much interest in this as NOAA does, right? And if they are in fact holding the documents, I am still mystified by that.

Mr. POWNER. That circular argument is perplexing, although I will add if you look back on the history of the NPOESS program, there are times when some of DOD's actions, and I mentioned this in my oral statement, where we questioned their commitment to the program. If you go back historically, they didn't fund the program fully at one point in time, and I think this is another action that just raises a red flag about their commitment to the program.

Mr. INGLIS. Why would that be? That is a helpful thing to know. They are thinking they don't—maybe this isn't their number one priority or what is your guess on that?

Mr. POWNER. Well, weather is clearly important to the Department of Defense in many areas. Clearly there probably are other priorities, and right now they have legacy systems that provide the information they need.

Mr. INGLIS. Do they think that the things that we are adding to this, the complexities, the additional sensor, all these kind of things, are beyond what their needs are and they are sort of muscling their way to say, well, we really don't want that anyway?

Mr. POWNER. I think you will get different stories from DOD. In fact, we talked to many of the user groups who represent the Department of Defense, and they are clamoring for some of the information that will come out of the NPOESS program.

Mr. INGLIS. Admiral Lautenbacher, do you have any theories on that?

Vice Admiral LAUTENBACHER. Yes, and this is speculation. As I said, I talked to Mr. Young's assistant this morning, and there is concurrence that the documents—that they are interested in signing the documents and they are interested in helping us sign the documents and they are going to work hard. We are going to work

together to try to make this happen. So that is why I am hoping the Committee does not have to step in, that we can finish this ourselves.

I think—there are two things going on. First of all, and again, having worked in DOD for a number of—in services; I did work in DOD as well at one point. Mr. Young is relatively new in his position. He has a portfolio that has significant issues with it, as Dr. Bartlett mentioned, and he is trying to get control and hold of this monster that is the DOD establishment and put some discipline and authority in it. And so he is, you know, putting some markers on the table that we are going to do this right. We are going to manage by the book, we are going to provide the right documentation, and we are going to—and I couldn't agree with him more. I agree with that. We need to do it, and I am just as concerned as he is, and I have seen this before in the Department of Defense because it is hard to coordinate documents within the Department of Defense, let alone with DOC and DOD and NASA where people have threatened to cut off the money because you didn't finish paperwork. And I don't want to say this is idle paperwork, but you know what I mean, you didn't finish the job as designed in order to provide the baseline information for a program. So it is not an unusual tactic inside the Department of Defense to sort of enforce, you know, the need to do the job on time and do it well. And I think we are seeing some of that.

Mr. INGLIS. Thank you, Admiral. Thank you, Mr. Chairman.

Chairman LAMPSON. Dr. Bartlett, you are recognized for five minutes.

BUREAUCRATIC DELAYS

Mr. BARTLETT. Thank you very much. I think there are probably three basic reasons for bureaucratic delays, and I would like each of you to respond to this. One reason is that they just are incompetent. The second reason is that there is too much for them to do. They just can't get it done. The third reason is that there is not enough for them to do which always results in delays. Dr. Parkinson has noted that work expands to fill the time available for its completion. As a matter of fact, it may grow even larger because if you are a bureaucrat and there is really not enough for you to do, you make sure that it appears that you have too much to do by letting things pile up on your desk. I noted that in our local county where building is way down, and now it takes twice as long to get a building permit through as it did when we were booming.

Which of these three is the reason for the bureaucratic delays in this program?

Mr. POWNER. I would clearly go with number two and the lack of this being a priority, too much and how it competes with other priorities.

Vice Admiral LAUTENBACHER. I agree with that, but I would also say that I don't know enough about each one of the many, many offices that this goes through. I know about ours, and I would—the ones I know about it, I generally agree it is too much to do, and I would make the point that most of this documentation—and I have watched over 40 years—I have watched the documentation grow and grow and grow and grow because requirements have been

added because somebody made a mistake somewhere, and you got to make sure they are never going to make that mistake again. So you put a requirement and a document or a new document, and it grows and grows and grows. And we are victims to that process. Now, I am not here to say that these documents are not necessary, but in fact, work has expanded and there is an awful lot to do at this point to ensure that every "i" is dotted and "t" is crossed.

Mr. BARTLETT. Dr. Parkinson also made another very interesting observation and that was that the larger an organization gets and with these three agencies, you are dealing with a lot of people, but the larger an organization gets, the more energy is spent in internal communications; and pretty soon at some point all the energy is expended in internal communications and nothing gets done.

And Admiral, your last comment seemed to indicate that there is a bit of that going on.

Vice Admiral LAUTENBACHER. Yes, but we have made a great deal of progress on these documents after going through a lengthy review. The human mind is a very ingenious animal and does things—humans do things that—what happens in this system is that when you get to the point where you are totally absorbed in self-communications, we start load shedding basically; and you find offices that are off to the side that don't get into the game anymore because most responsible people who take on tasks know they have to complete the task and they figure out some way to do it. And if that requires bypassing the bureaucracy, creating new processes that minimize their effect on it, it happens. And so I believe there is a continual cycle here of trying to get ahead of the problem but more requirements keep getting piled on. And we are in that battle day by day.

Mr. BARTLETT. It is always true, I think, that what is everybody's business is nobody's business, and I think one of the problems of this program is that there are too darned many people responsible for it. Why don't we have just one person responsible for it who makes the decision? He either lives or dies on the basis of those decisions? When you have a big bureaucracy, everybody has tried to protect themselves so that they can't be faulted for a failure. What can we do to get around this bureaucracy so that one person makes the decisions? Committees shouldn't be making decisions, people should be making decisions so that we can get the job done.

Vice Admiral LAUTENBACHER. I agree having now had to work with the system for a number of years, it is cumbersome. It is the first time we have tried to do a program like this with three large agencies with three different sets of requirements, three different sets of acquisition rules, three different sets of administrative documentation, et cetera. I think that there are things that we could do to make the structure more streamlined, and my intention is to try to include that in this alternative management study that we are talking about because this is not a good way to do business over the long-term. And as I said before, human beings are ingenious. We will work out ways to improve this. So that is my intention at this point anyway.

MORE ON ACQUISITION DOCUMENT APPROVAL

Chairman LAMPSON. Thank you, Dr. Bartlett. That is something we may have to keep in mind and make sure we learn a lesson because something is going to be coming after this. We may not want to do this again in the manner in which it has been done.

We were talking about some of the decisions that were pending, and you had made a comment about NASA, waiting on NASA, when we talked about the Award Fee Plan and Fee Management Plan.

Vice Admiral LAUTENBACHER. Yes.

Chairman LAMPSON. The report that we have got indicates that NASA was completed with its decision on June 4th, that we were ready with the Commerce Department concurrence. So what does that leave?

Vice Admiral LAUTENBACHER. Yes, and we have word that they have completed it, but that was after it was sitting there for three or four months. So it is good to say it is out today, but you have to look at the whole history of this thing. And as I indicated, I believe that will be signed today or tomorrow. We have completed the Fee Management Plan.

Chairman LAMPSON. Money is truly—time is money, and we are looking at a lot of money. The Acquisition Program Baseline, it is waiting for DOD, DOC determination, APB budget numbers?

Vice Admiral LAUTENBACHER. Yes, and we want to make sure because this is a document that will be fundamental to the budget. Remember, we ask due diligence. The Executive Committee asked that we re-evaluate the operations and support costs because the operations and support costs was carried forward from 2002. None of us believe that is accurate. We ask that that be redone because I don't want to have to come up and answer to the Committee why we didn't do that so that we have an independent cost estimate, we have a program estimate now because we created the ability to be able to do that in our program so that we can provide the program cost estimates because we want to lay that into the Acquisition Program Baseline. Right now we have the people that did those budgets reconciling them. It is going to come back to the EXCOM to review and lay it in, and that is the last piece of this deal. It is basically the operations and support costs that we talked about and potentially the need for more reserve on VIIRS, although that is not clear at this point because we have been able to manage around the issues on VIIRS with the estimate that we had created from the Nunn-McCurdy. Remember, we have gone three years now with the budgets and the schedule that we have laid in because of our intention to make sure there was enough reserve to be able to handle issues like this that have come up.

Chairman LAMPSON. Mr. Powner, would you comment on—give me your feeling of the relationship between the earned value management system and the baseline management program, baseline program?

Mr. POWNER. Well, that is one area where we have had previous recommendations in this area, and I think the Admiral made some comments about how they get very detailed data. One of the things that has been very valuable on this program is when there is a cost

increase or a slip in schedule, folks know about it through the use of earned value techniques; and they know about it at very high levels. I know the Admiral made a comment to me at one time that he can hear a pin drop on this program. Well, that is good because we want to be all over those costs and schedule issues. Now, we have a number of them that are coming up here, and we talked about this $1 to $1.5 billion cost increase. We just need to disclose that fully and move forward with an accurate baseline from this point forward.

LIFE CYCLE COSTS

Chairman LAMPSON. Okay. Let us shift gears. Admiral, General Mashiko was asked if she was confident that the NPOESS program would be executed for the estimated $12.5 billion in life cycle costs for the program that emerged from Nunn-McCurdy. She said that she couldn't be definite while negotiations with Northrop Grumman were occurring to implement the new plan but that she felt that it was the right number. Given what you know now, what is the life cycle cost?

Vice Admiral LAUTENBACHER. I think the life cycle cost will have more operating costs at the end, so it is going to be larger than $12.5. I think it is likely to be somewhere between $12.5 and perhaps $13.5, in that region. But we are I think very close to where we need to be on this at this point in terms of—I am not going to sit here and guarantee that everything is going to work perfectly for every nickel that is scheduled for the next 26 years—is what we are talking about here—or the next 20 years or so.

Chairman LAMPSON. Mr. Powner, you have seen data on the life cycle cost. You briefed our staff that it appears there will be an increase of $1.1 billion in the estimate. What accounts for that number?

Mr. POWNER. Yeah, I think at least we will see a $1.1 billion increase. That is roughly $300 million to address the technical issues with the sensors and $800 million associated with additional operations and support, but I will add to that that there is a potential for increased security costs; and that range could also be in the hundreds of millions of dollars. We are probably more in the camp that the life cycle cost is going to be closer to $14 billion.

Chairman LAMPSON. Okay. If I add up the lower-end ranges that you just gave us, $1.2 billion in cost growth. If I add the high ends of the ranges you get $1.8. So it is already higher than last week. Where are you getting those numbers and how much confidence do you have in them at this point?

Mr. POWNER. We got those rough ranges from the program office. So you know, I think in our official statement we said at least a billion, but, again, I think we will be probably closer to $1.5.

One other point, too, with the security issues that have been raised, we have taken a long time to make a decision on what our security approach is for the ground stations. The longer we sit on that, the likelihood that the costs are going to be going up; and that reason for that is when you build security in late in the development cycle, it is always more than if you build it in early. So that is a concern going forward.

Chairman LAMPSON. Should any of these additional costs not be included in the final program baseline? For example, if we incorporate the cost for VIIRS recovery into the baseline, doesn't that give future managers a false impression of the program's cost and schedule performance?

Mr. POWNER. Well, I think the VIIRS issues need to be addressed and we need to build those into the program. And I think from a security perspective, to the program's credit, they are looking at options to keep costs down, so that is a good thing.

Chairman LAMPSON. Are we ever going to get to a point where we really won't see any hefty jumps in the program cost estimates every year, year after year? Both of you.

Mr. POWNER. Hopefully, there will be greater stability once NPP flies and we start looking at the performance with the operational bird at that point in time. I think that is when there will be more stability.

Vice Admiral LAUTENBACHER. I agree with that. We need to finish testing on the VIIRS system, and we need to launch NPP. At that point, I think we will be close to out of the woods on what the system will really cost.

Chairman LAMPSON. My time is expired. Let me yield to the Ranking Member, Mr. Inglis.

Mr. INGLIS. For a brief question. I have got a corollary to the Bartlett theory of bureaucracy. Dr. Bartlett described one—the reasons for bureaucratic delay could be one, incompetence; two, too much work; and three, not enough work and the work expands to the time available. I think that a fourth possibility is that when you have a complex, difficult project that encounters a slowdown, it moves to the front corner of the desk. And that slowdown goes on for a week or two. It moves to the floor. And when that file hits the floor, there is an enormous amount of mental energy to bring it back up onto the desk.

So I wonder if what we are learning here is that one agency should have owned this, and I guess the idea was to prevent three from launching satellites. So therefore, let us get some efficiencies, economies of scale by having just one. But I wonder if one should have owned it with two others being customers or tenants on that piece that is owned by the one. Either of you have thoughts about that?

Vice Admiral LAUTENBACHER. That is a model that looks awfully good right now to me. I have to admit I was not in on the original discussions in the '90s. I was in the Navy at the time, and I didn't want the Navy anywhere near this. So we stayed out of it. But the discussions went on at high levels, and it was finally decided by the White House how to deal with setting up this program. So there was a lot of work that went into trying to think about this model. And I believe in the fewer complications and the executive authority where you really have the authority. The programs that I can manage and I will come and tell you about, we just got an excellent score on our tsunami warning program which is now a worldwide system which you supported. It was a program we started. It was graded by OMB as 93.4. It is only one of 11 percent of programs in the Federal Government that got the effective rating from our

Office of Management and Budget. It is IOCed.[12] The buoys are out around the world now providing 24/7 coverage for tsunami warning to the United States. That is a program I can control and put inside. So when you have an agency controlling, you have a much better chance for success on these things; and any time you bring in more agencies, you got a problem. I have no problem really with separation of responsibilities, having customers that come in with their needs and you make a decision and move on. As I said, I would like to look in the alternative management study. I will push that from my end of it to deal with is there some way to streamline the structure we have today so we don't get into this problem we have now of trying to update the MOA to make sure that DOD's executive authority is exactly prescribed correctly in accordance with what the lawyers will think it will work across a three-agency boundary. Thank you, sir.

Chairman LAMPSON. Mr. Bartlett, you are recognized for five minutes.

Mr. BARTLETT. Thank you very much. This program is typical of many of our programs in DOD. The costs just keep going up and up. When I repeat the Lord's Prayer and I come to that part that says lead us not into temptation, I wonder how we can enter into some of our contract agreements and still do that prayer because when you enter into a contract agreement where the more it costs, the more the contractor makes, we are doing something similar to what the chaplains at Ft. Leonard Wood said we were doing when we put young men and women in such close confines. What we were doing runs contrary to the powers of nature.

Somehow we have got to get around this, and I think that pushing the envelope and not knowing definitively what can be done when you start the program is a major reason for this, but at the end of the day you say, gee, you really ought to get 15 percent profit. And so the reality is that the worse they do, that is, the more it costs, the more they make. How do we get around that?

Vice Admiral LAUTENBACHER. If you look at the Fee Management Plan for this program, it has been reduced down to 12 or 13 percent. So they can't get any—we have already reduced it below that, and there is only two percent of that which can be, what I would say, judgmental. The rest of it is tied to meeting requirements on the Nunn-McCurdy revised schedule and performance. So they are under the gun, and they are being given their so-called reward based on the ability to perform. And in many areas, they have not been doing well, and in other areas, they have been doing well because I mentioned four of these instruments are on track. So it is a mixed blessing from the contractors' point of view.

But what you bring to account is the idea of the cost plus contract which is an issue. And that is kind of a philosophical discussion. Do we save money on cost plus contracts, even if they go over, or would it be better to try to go fix price up front. When you try to do that for a development area where you really don't know what you are doing in terms of what you can develop, we have had a lot of trouble with that, too. So that is another part of the decision. I don't like the cost plus program, I certainly don't like them

[12] Initial Operational Capability

for NOAA because NOAA is an operational agency. I think the research should be done elsewhere, and when we get an instrument, we should just buy it and there should be a price and a contractor that produces it and we will execute it. We are a 24-by-7 operational agency. I don't like the idea of taking on development risk within the NOAA framework. We have other agencies that do that and where their strong point—what I believe is their strong point—and I have been a strong proponent of planning together across the agencies, develop space instruments versus the agencies that use them.

So I think that is a critical need for us to work on as a government.

Mr. BARTLETT. For 16 years now I have been watching programs in DOD and almost never do we come in on time, on budget; and it would seem that we ought to learn a little from history and someone, maybe GAO, needs to take a look at this. And this is a long history. It precedes by many years, my short 16 years of watching this process. How come we never get it right? This program is just typical of many of our programs, and you are not unique in the problems that you have.

Thank you very much, Mr. Chairman.

Chairman LAMPSON. You are welcome, and we are running a little bit out of time, close on our votes that we have, so I am going to be very quick. I have wanted to make a corrected statement that I made at the very, very beginning when I talked about the gentleman who received an award the other day with whom I had gone to college, and then you began talking about the tsunami program. Dr. Eddie Bernard—and I said Dr. Eddie Beaumont—I meant Dr. Eddie Bernard from Beaumont, Texas—pardon my—getting ahead. My tongue got faster than my brain was working apparently, but Dr. Bernard is the Director of the Pacific Marine Environment Laboratory and has done significant work. And obviously, the role that he played in creating that tsunami warning system is something that we are all very, very proud of, proud to have known that I sat in some of the same classes with him. I just wish I had learned more along the way.

Thank you all, both, for being here and the panel members for raising the questions that we have done today, and hopefully we will move this program forward because we know how critically important it is to our whole country and this Earth.

So thank you for appearing before the Committee this morning, and under the rules of the Committee, the record will be held open for two weeks for Members to submit additional statements and any additional questions that they might have for the witnesses. This hearing is now adjourned.

[Whereupon, at 11:30 a.m., the Subcommittee was adjourned.]

Appendix 1:

Answers to Post-Hearing Questions

ANSWERS TO POST-HEARING QUESTIONS

Responses by David A. Powner, Director, Information Technology Management Issues, Government Accountability Office

Questions submitted by Representative Bob Inglis

Q1. The Nunn-McCurdy certification decision reduced the number of instruments on the NPOESS satellite from thirteen to nine and reduced the functionality of four of the nine remaining sensors. The decision stated that these instruments could be remanifested if other parties funded them. The National Oceanic and Atmospheric Administration (NOAA) has announced that two of the sensors have since been added back to the configuration of the satellite and has expanded the capability of another instrument.

Q1a. What was the point of going through the Nunn-McCurdy process, particularly with respect to reducing the number of instruments in order to lessen the risk of the mission, if the NOAA was going to put all these instruments back on?

A1a. According to the June 2006 decision, the program restructuring was intended to reduce the acquisition's complexity and risks while ensuring the continuity of existing satellite programs and data. The decision also allowed the program the flexibility to remanifest key instruments if they were funded outside the program and approved by the tri-agency Executive Committee guiding the NPOESS program.

In January 2007, NOAA and the National Aeronautics and Space Administration (NASA) prioritized the capabilities of the instruments that were degraded or removed from the NPOESS program. The highest priorities included Earth radiation budget, solar irradiance, and improved ozone measurements. These measurements were expected to be provided by the Clouds and the Earth's Radiant Energy System (CERES) sensor, the Total Solar Irradiance Sensor (TSIS) sensor, and the limb component of the Ozone Mapper/Profiler Suite (OMPS), respectively.

Given these priorities, the NPOESS Executive Committee decided to make two modifications to the NPOESS Preparatory Project (NPP) demonstration satellite—by adding a CERES sensor and restoring the full functionality of the OMPS sensor. In addition, the Executive Committee decided to add one sensor, TSIS, to the first NPOESS satellite. No changes were made to the three other satellites in the NPOESS program. NOAA officials reported that these modifications are being funded outside of the program and that TSIS will not be permitted to delay the NPOESS schedule. Specifically, the program office reported that TSIS will not be included on the satellite if it falls behind schedule.

While restoring selected sensors and functionality to NPP and the first NPOESS satellite involves added risk, the program has attempted to mitigate these risks by selecting sensors and technologies that are well understood and maintaining the option to not include TSIS if it falls behind schedule. Further, program officials have decided not to reintroduce other sensors that were removed (including the Advanced Polarimetry Sensor or the Radar Altimeter) or to restore the functions of other sensors that were degraded (including the Conical-Scanned Microwave Imager/Sounder and Space Environment Sensor Suite) at this time.

Q1b. Was there any other way to maintain the climate and environmental data short of restoring these instruments?

A1b. In our May 2008 report, we highlighted several short-term options for restoring selected climate sensors, including adding sensors back to a later NPOESS satellite, adding sensors to another planned satellite (such as Landsat—a joint NASA/U.S. Geological Survey mission), and developing a new satellite to include several of the sensors.[1]

In addition to short-term options, the Federal Government needs to consider long-term options. We reported that NASA, NOAA, and the Department of Defense (DOD) lacked plans for restoring sensor capabilities on a long-term basis. We recommended that the three agencies establish plans on whether and how to restore the climate and space sensors removed from the NPOESS program, in cases where the sensors are warranted and justified. This would include justifying the additional funding needed to develop these sensors within their respective agency's investment decision processes. The result of this planning will help determine the best and most

[1] GAO, *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).

cost effective way of maintaining relevant climate and space environment data records.

Q2. In your testimony, you mentioned that there was a newly identified risk of changing security requirements.

Q2a. Can you please explain the basis for the concern about these requirements?

A2a. As we noted in our testimony and in the accompanying report, changing security requirements late in a system's development can add cost and risk to the program.[2] To date, NPOESS has been designed and developed to meet DOD's standards for a mission essential system. However, NOAA officials believe that the system should be built to meet more stringent standards—specifically to a high security level per Federal Information Processing Standards Publication 199. Implementing more stringent standards could cause rework and retesting, and potentially affect the cost and schedule of the system. Program officials are assessing options and expect to decide on security requirements by September 2008.

Q2b. You also mentioned there was a March 2008 study of the impacts and costs of adding additional security to NPOESS. Has GAO received a copy of this study? If not, when do you expect to see a copy and what were the reasons you were given for not releasing it to the GAO?

A2b. We received a summary of the March study in June 2008. This study identified the new requirements and contained rough estimates for implementing the various upgrades depending on when and how the various changes were made. The Chief Information Officer of the NOAA subcomponent the National Environmental Satellite, Data, and Information Service noted that the office is currently working with the NPOESS program office to outline the specific engineering solution for the requirements and anticipates a better cost estimate after that effort is completed—which is anticipated to be later this summer.

Q3. There seems to be continuing problems with some of the sensors, in particular the Visible/Infrared Imager Radiometer Suite (VIIRS) instrument. In previous reports, GAO has characterized the risk as, in part, due to problems with contractor and oversight issues on the part of the NPOESS program management. Since we are still seeing problems with the sensors, even with the increased oversight by the government, what can be done to improve the performance of the contractor?

A3. In our May 2008 report, we noted that the program office had recently instituted biweekly senior-level management meetings to review progress on the status of the VIIRS instrument's development, and that program officials had stated that both the prime contractor and the program executive office will have senior officials on-site at the contractor's facility to provide extensive, day-to-day oversight of the prime contractor and subcontractor management activities to assist in resolving issues. This is in line with an independent study (called the Alternate Management Study) that recommended in June 2007 that the program office provide more systems engineering leadership for the program and intensify management and technical oversight over the prime contractor. More recently, the Defense Contract Management Agency and the prime contractor conducted reviews of the subcontractor responsible for VIIRS and recommended further management changes. Program officials reported that the subcontractor is working to implement these changes while the program office is overseeing these efforts. In our report, we stated that it is important for the program office, the Program Executive Office, and the Executive Committee to continue to provide close oversight of milestones and risks.

Q4. One of the most significant problems I believe you raise in this report is the concern about the loss of sensor capability on satellites past the NPP and first NPOESS satellites due to a lack of planning. You state in your testimony that the agencies may lose "windows of opportunity" for selecting the most cost-effective options with regards to sensor acquisition.

Q4a. Considering the ballooning cost of this program as it is, what was the agencies' response to this concern when you presented them with the draft report?

A4a. In written responses to our May report's recommendation, all three agencies agreed with the recommendation to develop long-term plans for whether and how to restore the climate and space environment sensors removed from the satellites. In addition, both the Department of Commerce and NASA reiterated that they are

[2] GAO–08–899T and GAO–08–518.

working with their partner agencies to finalize plans for restoring sensors to address the Nation's long-term needs for continuity of climate measurements.

Q4b. How soon should such a plan be developed before the costs become prohibitive?

A4b. There are many options available for obtaining climate and space data continuity, such as including selected sensors on other NASA, European, or NPOESS satellites. However, as time goes by, selected options will no longer be viable because the window of opportunity for adding sensors to those satellites will close.

While other satellite programs may have different requirements, NPOESS program officials stated that they need at least six years' notice in order to add sensors to their satellites. This means that agencies would need to identify their plans to add sensors to the second NPOESS satellite by January 2010.

In responding to these questions, we relied on information we previously reported on NPOESS.[3]

[3] GAO–08–899T; GAO–08–518; GAO, *Polar-orbiting Operational Environmental Satellites: Restructuring is Under Way, but Technical Challenges and Risks Remain,* GAO–07–498 (Washington, D.C.: April 27, 2007).

ANSWERS TO POST-HEARING QUESTIONS

Responses by Vice Admiral Conrad C. Lautenbacher, Jr. (U.S. Navy, Ret.), Under Secretary of Commerce for Oceans and Atmosphere; Administrator, National Oceanic and Atmospheric Administration (NOAA)

Questions submitted by Representative Bob Inglis

Q1. You mention in your testimony that the NPOESS program uncovered some design flaws with the Visible/Infrared Imager Radiometer Suite, or VIIRS, specifically relating to fasteners and screws. This is not a highly technical part of this critical instrument.

Q1a. How could an oversight of this kind occur?

A1a. There were two fastener related issues on the Visible/Infrared Imager Radiometer Suite (VIIRS): titanium bolt breakage and jackpost breakage. Titanium bolts have properties that require slow tightening during installation to prevent weakening of the part. Consequently, we are looking very closely at the processes undertaken by the VIIRS contractors, particularly those associated with installation and quality control. The bolt was taken from a new batch and that lot was sampled, inspected and tested without any issues noted. No other parts in the original batch displayed failure.

The fasteners, called jackposts, are custom designed parts. The root cause of the jackpost failure is that the parts did not meet specifications as defined by the government. The part supplier was a trusted vendor to Raytheon and the parts were not subjected to the appropriate level of inspection by Raytheon upon delivery. The acceptance process for parts has been reviewed to ensure that a similar lapse will not occur again. Subsequent investigations by the NPOESS Program and contractors have revealed that the remaining jackposts on VIIRS are flight worthy and we only need to replace the 18 jackposts that broke.

The NPOESS Integrated Program Office (IPO) and contractors are reviewing internal control processes to ensure that similar incidents do not happen again. The government is continuing its investigation of the processes and actions of the VIIRS contractors. The government is putting in place design and quality process changes to use standard parts as much as possible, and are instituting mandatory parts screening and inspection for all vendors.

Q1b. Is there a process in place to prevent such oversights from occurring in the future so that minor parts of the instruments do not lead to major problems later on? What assurances do we have that these types of problems are not pervasive throughout the rest of the instruments?

A1b. We have put in place both design and quality process changes which include:

1) Using standard parts instead of custom parts wherever possible during design; and
2) Mandatory screening and inspection on all incoming parts regardless of vendor past performance.

Specifically for VIIRS, the team is reviewing all custom parts and the associated spares to ensure no issues exist with other components on the sensor. To assure ourselves that the VIIRS issues are not systemic to this program, the NPOESS IPO tasked Northrop Grumman, the NPOESS prime contractor, to perform Mission Assurance audits of each of their subcontractors.

The IPO continues to provide oversight of the NPOESS contractors to improve their adherence to program specifications and quality control of the manufacturing processes. The IPO, NOAA and the National Aeronautics and Space Administration (NASA) continue to work closely to ensure that there are clear lines of communication between the government and the contractors.

Q2. The President's FY09 budget request includes $74 million for the development of the CERES (Clouds and Earth's Radiant Energy System) and TSIS (Total Solar Irradiance Sensor) instruments. These are two sensors that had been demanifested by the Nunn-McCurdy certification process and the money for their development can not come from the NPOESS program baseline.

Q2a. Is this just an additional $74 million that NOAA and NASA are asking for? Or does this ask reduce available funds in other NOAA programs?

A2a. The $74 million for the Climate Sensors/Climate Data Records is an additional increase in funding for NOAA's satellite budget request. No other NOAA program funding was reduced to support this new initiative.

Q2b. Has NOAA explored the possibility of putting these sensors on separate vehicles to maintain the integrity of the current launch schedule?

A2b. NOAA and NASA, in collaboration with the Office of Management and Budget and the Office of Science Technology Policy, assessed the processes and capabilities required to build these instruments and place them onto the appropriate and most cost-effective satellite. Careful consideration was given to cost, schedule, and technological maturity of the sensors, as well as the capability of the Federal Government and its contractors to successfully deliver the instruments. The assessment also included a review of available launches, the cost and feasibility of single mission satellite launches and the time required to launch these sensors to ensure uninterrupted continuity of the climate measurements.

Based on the planned timing of the launches of the NPOESS Preparatory Project (NPP) and the first NPOESS satellite (C1), and the dates when the sensors are needed on orbit to ensure continuity of the climate record, the decision was made to place the Clouds and the Earth's Radiant Energy System (CERES) Flight Model (FM) #5 on NPP, and Total Solar Irradiance Sensor (TSIS) and CERES FM #6 instruments on C1.

Full funding of the NPOESS-related budget requests in the appropriations bills for NOAA, the NASA, and the Air Force appropriations bills is required to ensure the climate sensors can be integrated and launched on the respective NPP and NPOESS satellites.

Q2c. In the event that Congress does not pass an Appropriations bill for FY09, what will be the affect of a continuing resolution on the development of these sensors? How does that affect our ability to collect relevant climate data?

A2c. NOAA will be operating under a continuing resolution in FY2009 until at least March 6, 2009, which will impact current acquisition and development activities. While the mitigations of the continuing resolution impacts are still being evaluated, the funding shortfall will slow initiation of GOES–R flight and ground efforts which could result in a launch delay and/or increased life cycle costs. The funding shortfall will also place the schedules for CERES and TSIS at high risk for meeting the January 2013 NPOESS C1 launch. Additional costs to CERES and TSIS could also be possible to accelerate deliveries or accommodate late deliveries if feasible.

If the CERES FM6 and TSIS instruments are not available in time to be integrated onto NPOESS C1, the Nation's scientific community would be at high risk of a data gap for these critical global environmental measurements. Such a break in the climate record would introduce uncertainty and compromise climate information for decision-makers. In addition, the loss of these data would require many years of calibration to recover.

Q3. The Nunn-McCurdy certification included $1 billion placeholder in the estimated life cycle cost for operations and support—essentially what is needed once the satellite is actually launched. This placeholder was originated in the 2002 Acquisition Program Baseline. GAO has informed us that as the launch date gets closer, this figure will go up by another $800 million, in part because it hadn't been updated since 2002.

Q3a. Why is the additional $800 million needed if now there are only four satellites, whereas in 2002 there were six satellites to support and the program estimated only $1 billion for operations and support purposes?

A3a. The Nunn-McCurdy certification process of the NPOESS program only examined development and production costs, not operations and sustainment (O&S) costs. In fall 2007, following the completion of the program restructure after Nunn-McCurdy that scaled back the program from six to four satellites, the NPOESS program was directed to execute a complete program estimate including O&S costs given NOAA's concern that the program did not have a realistic estimate of those costs. Following the Program Office Estimate completed in December 2007, the EXCOM requested the Department of Defense's Cost Analysis Improvement Group (CAIG) complete an independent review of the total program costs to further validate the estimate of operations costs as well as the development and production costs estimated during the Nunn-McCurdy certification process. The EXCOM received those results in July 2008.

The 2002 O&S estimate only included costs from the time of launch through the initial ten years of on-orbit life, while today we expect operations to last 17 years

following initial launch. The recently completed estimate took into consideration some NPOESS Preparatory Project (NPP) costs that were not captured in the 2002 estimate. The recent estimate was also completed with far more knowledge of the system than the earlier estimate and consequently added more detail and accuracy to the overall life cycle cost estimate.

Overall, the cost for operations and sustainment is not directly linked to the number of satellites, but the length of time the satellites will be on orbit and the corresponding costs to maintain the processing software, and the need for periodic updates of the ground processors. The recent estimate of operations costs better estimated the needs for software and processor updates and indicated that an additional $800 million is required to support the operations of the NPOESS program.

Q3b. If the $1 billion is incorrect now in 2008 by $800 million, it must have been incorrect in 2006 when the program was being subjected to the Nunn-McCurdy certification process. Why was the figure not updated then, or even before?

A3b. As noted above, the Nunn-McCurdy process as defined by DOD for the NPOESS program only examined development and production costs, not operations and sustainment costs. This is why NOAA requested the NPOESS program provide a complete cost estimate following the restructure in Fall 2007. In March 2008, the EXCOM requested an independent cost estimate be completed by the CAIG and the final results were reported to the EXCOM in July 2008.

Q4. If there are problems that still exist in the program that cannot be agreed to at the staff level, why are they not resolved at the periodic EXCOM (Executive Committee) meetings?

A4. Problems that cannot be resolved at the staff level are addressed at the EXCOM meetings. However, given the unique tri-agency structure of this program, the NPOESS program has found it challenging to navigate the bureaucracies of the three separate agencies to get final documents representing complex agreements signed in a timely manner even when agreed to in principle at EXCOM meetings. Progress has been made to improve the process within the tri-agency program during the last few months.

Q4a. Please provide a detailed agenda of each EXCOM meeting since it was formed in 2006 and please detail what decisions were made in each meeting.

A4a. The following table provides the date of the nine EXCOM meetings conducted since it was formed in 2006, and a detailed list of decisions made at each meeting.

EXCOM Date	Decisions
Wednesday, June 28, 2006	(1) Approval to execute restructure schedule; (2) Inclusion of contractors in future NPOESS Executive Committee (EXCOM) meetings; and (3) Process for control and distribution of data
Friday, September 08, 2006	(1) Directed NPOESS System Program Director (SPD) to immediately report to the EXCOM any critical issues in Visible Infrared Imager/Radiometer Suite (VIIRS) engineering development unit (EDU), and to then provide alternatives for future flight models; (2) Directed SPD to provide regular updates on process to put in place a Conical Scanning Microwave Imager/Sounder (CMIS) replacement; (3) Directed SPD to provide assessment on cost-effectiveness of flying Ozone Mapping and Profiler Suite (OMPS) with or without Limb; (4) Northrop Grumman Space Technology (NGST) and Raytheon merge VIIRS baseline schedule to report direct data; (5) Directed SPD to plan for possible continuing resolution (CR); (6) Emphasized importance of adhering to schedule to maintain operational continuity; (7) Approved closure of 8 IRT actions, 4 IPA actions, and 5 ADM actions; (8) Directed NPOESS Program Executive Officer (PEO) to provide a methodology for remanifesting sensors; and (9) Provide detailed VIIRS restructure plan at next EXCOM

Monday, December 18, 2006	(1) Directed that NOAA/Acquisitions and Grant Office (AGO) be added as non-voting member of Award Fee Review Board; (2) Fee should be decremented for late attainment of a milestone; (3) EXCOM would explicitly approve any rollover of unearned fee; and (4) Government-only meetings be held to review contractor performance in addition to EXCOM meetings
Friday, March 02, 2007	Concurrence to proceed to Test Readiness Review for VIIRS (contingent on resolution of crosstalk – an open issue from Gate 8)
Friday, June 22, 2007	(1) October 2007 EXCOM meeting to include VIIRS expected performance vs. original specification; (2) Requested most capable instrument possible without impacting NPP launch date; and (3) Directed Raytheon to present their plan for an alternate Integrated Filter Assembly design
Friday, October 05, 2007	(1) Directed program to continue with the Baseline Integrated Filter Assembly (IFA) for NPP; fix IFA for C1 and beyond; (2) Reviewed options for manifesting CERES onto NPP – tabled decision pending closure of NASA Science Mission Directorate (SMD) Program Management Council (PMC) actions; (3) Concurred with MIS acquisition strategy; and (4) Received AMS Study outbrief, directed PEO to address recommendations and provide next steps

Wednesday, January 16, 2008	(1) Concurred with PEO recommendation to add additional instrumentation for VIIRS to resolve ambiguities; (2) Concurred with PEO recommendation to assign seasoned industry leader on-site from NGST through Pre-Environmental Review; (3) Directed PEO to have bi-weekly reviews with VIIRS contractor leadership; (4) Concurred with delay in delivery of VIIRS to NPP (slip from Jul 2008 to Apr 2009) due to Raytheon's poor performance, allowing for 60 days additional schedule reserve outside of contractor's VIIRS schedule; (5) Directed PEO to address all of the IRT's recommendations; (6) Directed NPP team to proceed with CERES FM-5; and (7) Directed CAIG to review near-term funding requirements to ensure adequate reserves in FY 2010 and FY 2011
Friday, March 14, 2008	(1) Directed CAIG to do a complete budget review from Nunn-McCurdy estimate; (2) Discussed path forward on legacy vs. IORD thresholds; (3) Reviewed remaining steps to choose new SPD; (4) Reviewed process and remaining steps for Fee Determination Official (FDO) to make Award Fee determination; and (5) Reviewed schedule for VIIRS and CrIS

Thursday, May 01, 2008	(1) Concurred with SPD Candidate; (2) Concurred with MIS lab selection; (3) Concurred with 2008 AMS scope of work: focused on prime-subcontractor relationships; (4) Directed further reconciliation of CAIG estimate and Program Office Estimate; (5) Approved TSIS on C1, pending delivery by December 2011 for spacecraft integration and test; and (6) Reviewed Joint Agency Requirements Council (JARC) recommendation, directed Key Performance Parameters (KPP) in APB to have IORD-II thresholds as objective and legacy thresholds as minimum

Q4b. If an item on the agenda is not resolved at an EXCOM meeting, does it appear on the agenda for the next meeting?

A4b. Most decisions made by the EXCOM have been resolved at the meeting in which the issue was scheduled to be discussed. However, there have been a few complex issues in the program since the Nunn-McCurdy certification, which have been more difficult to resolve. Those issues were included on multiple agendas during the past few years and have also been addressed and brought to final decision through multiple principal level teleconferences and other meetings between formal EXCOM meetings.

Q4c. Please detail the items on each agenda that were not resolved at the EXCOM meeting for which it was brought up and explain why no decision was agreed to.

A4c. As noted above, the EXCOM has been largely successful in resolving issues in the agenda at the time of the EXCOM. However, since the Nunn-McCurdy Recertification, the issues of budget reconciliation and cost estimates, as well as Acquisition Decision Memorandum document resolution have been ongoing issues that took multiple meetings and other interactions to resolve as these issues were processed formally through each agency. As noted above, this unique tri-agency program has made progress in merging the disparate processes in each agency to get final decisions documented.

Appendix 2:

Additional Material Submitted for the Hearing Record

THE UNDER SECRETARY OF DEFENSE

3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

ACQUISITION, TECHNOLOGY AND LOGISTICS

APR 30 2008

MEMORANDUM FOR SECRETARY OF THE AIR FORCE
JOINT CHIEFS OF STAFF/J-8
PROGRAM EXECUTIVE OFFICE, ENVIRONMENTAL SENSING

SUBJECT: National Polar-orbiting Operational Environmental Satellite System (NPOESS) Acquisition Decision Memorandum (ADM)

The NPOESS program was intended to maintain continuity and enhance environmental information by delivering an improved, affordable space-based environmental monitoring capability. Program delays, however, have jeopardized continuous access to environmental information. Therefore, the June 2006 Joint Requirements Oversight Council Memorandum (JROCM) 101-06 established priority for NPOESS system cost and schedule over the improvements to the legacy (2006 Defense Meteorological Support Program (DMSP) and Polar-orbiting Operational Environmental System (POES)) capability.

Definition of the required NPOESS capability needs clarification to reflect this change in priority as the program shifts from delivering improved capability to emphasis on the cost and schedule needed to maintain environmental information. The 2006 DMSP and POES performance values are to be considered as the threshold values for NPOESS performance. The values used in the NPOESS Integrated Operational Requirements Document II (IORD-II) shall become the objective values.

Per the Triagency Staff recommendation, the NPOESS requirements community (Joint Agency Requirements Council, Senior Users Advisory Group, and Joint Agency Requirements Group) shall define the 2006 DMSP and POES performance values in terms comparable to the performance values approved in the NPOESS IORD-II. This revised definition shall then be the basis for NPOESS Key Performance Parameters (KPP) threshold values. The Acquisition Program Baseline (APB) shall be updated to reflect these performance values, along with the CAIG estimate on Operations and Support costs, as program thresholds to fulfill the intent of the Tri-Agency agreement made in the 2006 JROCM.

The NPOESS program should continue to build to current specifications which will be the objective specifications, but should also be prepared to build to the new

threshold requirements reflecting legacy performance levels to preserve cost and schedule goals. Performance trades to KPPs should be minimized. !

The option for a viable, competing, management structure for the NPOESS program as stated in the June 5, 2006 ADM is critical to continuation of the program. The PEO/ES shall provide to me, no later than May 14, 2008, a status report on efforts to develop a viable alternative and complete this study no later than August 31, 2008. Also, the APB, Acquisition Strategy Report (ASR), Test and Evaluation Master Plan (TEMP), and Two Orbit Plan as described in the June 5, 2006 and June 7, 2007 ADMs shall be completed prior to August 31, 2008.

I am disappointed with the failure of NPOESS management to complete actions directed in the June 5, 2006 and June 7, 2007 ADMs. The Air Force shall continue to fully fund for costs incurred through September 30, 2008. Release of funding beyond September 30, 2008, however, will be contingent upon meeting the August 31, 2008 deadlines.

My points of contact are Dr. Chuck Frizzelle, charles.frizzelle@osd.mil, (703) 602-2720 x136 and Ms. Mona Lush, Mona.Lush@osd.mil, (703) 697-0476.

John J. Young, Jr.

UNITED STATES DEPARTMENT OF COMMERCE
The Under Secretary of Commerce
for Oceans and Atmosphere
Washington, D.C. 20230

MAY 16 2008

Honorable John J. Young, Jr.
Under Secretary of Defense for
Acquisition, Technology, and Logistics
6000 Defense Pentagon
Washington, D.C. 20301-6000

Dear Mr. Young:

Thank you for your Acquisition Decision Memorandum (ADM) of April 30, 2008, concerning the National Polar-orbiting Operational Environmental Satellite System (NPOESS). As one of the three NPOESS Executive Committee (EXCOM) principals, the National Oceanic and Atmospheric Administration (NOAA) is providing the following comments on your memorandum.

The performance thresholds to be listed in the Acquisition Program Baseline (APB) are a major issue for NPOESS. Over the past several months, the NPOESS user community defined legacy performance thresholds from the Polar-orbiting Operational Environmental Satellite program and Defense Meteorological Satellite Program. The NPOESS Joint Agency Requirements Council (JARC) met on April 28, 2008, to review the APB performance thresholds, and to address the overall issue of legacy versus Integrated Operational Requirements Document II (IORD-II) performance. The JARC unanimously agreed both legacy and IORD-II thresholds should appear in the APB. They also agreed the NPOESS program should strive to meet the original IORD-II thresholds, and the IORD-II objectives should remain as the NPOESS performance objectives. A breach will occur if legacy performance thresholds are impacted, and the EXCOM will evaluate any performance lower than the IORD-II thresholds. The EXCOM unanimously concurred with the JARC position at their May 1, 2008, meeting. I am concerned your latest ADM does not clearly state this trade space for the NPOESS program, and ask that you update the ADM to clearly delineate the trade space.

I am also concerned with the ADM statement that the APB will be updated with the Cost Analysis Improvement Group (CAIG) "estimate on Operations and Support costs." This statement does not mention the latest CAIG estimate for the Engineering and Manufacturing Development (EMD) and Production phases of the program. We are initiating a series of budget summits that will culminate in a Tri-Agency agreement on funding requirements to include the EMD, Production, and Operations and Support phases of the program. We anticipate finalizing these agreements during the June 2008 EXCOM with the goal of finalizing the APB submission. We would appreciate your office's participation in this process.

THE ADMINISTRATOR

Printed on Recycled Paper

Your recent ADM expressed disappointment in the "failure of the NPOESS management to complete actions" from previous ADMs. NOAA is also disappointed by this. However, I understand the documents to close these actions have been drafted for quite a long time, and the majority of the delays are due to staffing and final review within the agencies. At the May meeting, the EXCOM principals strongly encouraged their respective staffs to finish staff reviews. I ask that you echo this message to the Defense agencies responsible for the review and coordination of the remaining open documents.

NPOESS is a challenging Tri-Agency program and is important to NOAA and the Department of Commerce, as I believe it is viewed within the Department of Defense. As you prepare an update to your latest ADM, I urge you to please keep the EXCOM principals in close communication so the final oversight direction reflects the results of the EXCOM oversight process.

Sincerely,

Conrad C. Lautenbacher, Jr.
Vice Admiral, U.S. Navy (Ret.)
Under Secretary of Commerce for
Oceans and Atmosphere

WebCIMS Folder

Folder

RUSH

RUSH

From	[redacted]
Folder Number	[redacted]
Originating Org	Secretary of Commerce
Sender Email	[redacted]
Subject	National Polar-orbiting Operational Environmental Satellite Systems (NPOESS) Acquisition Decision Memorandum (ADM)
Primary Attorney	[redacted]
[redacted]	
Folder Type	Request
Folder Number	[redacted]
Folder ID	[redacted]
DOC Control Number	
Signature*	Under Secretary
Clearance Status(Exec/Sec Only)	
NOAA File List	
Date Due for LO	
Created By	[redacted]
Modified By	[redacted]
Initial Assigned	[redacted]
Date Received	[redacted]
Date Due	[redacted]
Date Closed	

URGENT

RUSH

URGENT

Attachments

Delete	Edit	Description	Type	Access Right	Owner	Created Modified
		Incoming Memorandum	Adobe PDF	NOAA/NESDIS	Peterson, Sheryl A.	05/14/2008 05/14/2008
		Memorandum For Under Secretary	Word Document	NOAA/NESDIS	Peterson, Sheryl A.	05/14/2008 05/14/2008
		Response Letter	Word Document	NOAA/NESDIS	Peterson, Sheryl A.	05/14/2008 05/14/2008

URGENT

RUSH

Assignments

Delete	Action	Assigned To	Assigned By	Status	Work Requests	Date Assigned	Date Due	Closed	Access Right
	FYI	NESDIS (Group)	Peterson, Sheryl A.	Active		05/14/2008	05/14/2008		NOAA/NESDIS
	Review	NOAA/ES (Group)	Peterson, Sheryl A.	Active	2000	05/14/2008	05/14/2008	[redacted]	NOAA/ES
	Signature	OLIA (Group)	Peterson, Sheryl A.	Pending	2030	05/14/2008	05/14/2008	[redacted]	NOAA/NESDIS
	Clearance	GC (Group)	Peterson, Sheryl A.	Pending	2100	05/14/2008	05/14/2008	[redacted]	NOAA/GC
	Clearance	ECO (Group)	Peterson, Sheryl A.	Pending	2200	05/14/2008	05/14/2008	[redacted]	NOAA/NESDIS
	Clearance	NOAA/POLICY (Group)	Peterson, Sheryl A.	Pending	2210	05/14/2008	05/14/2008	[redacted]	NOAA/NESDIS
	Clearance	NCOS (Group)	Peterson, Sheryl A.	Pending	2400	05/14/2008	05/14/2008	[redacted]	NOAA/NESDIS
	[redacted]	SEC	Peterson,						

		(Group)	[illegible]	[illegible]	2:00	05/14/2008	05/14/2008		NOAA/NESDIS
	Close	NOAA/ES (Group)	Peterson, Sheryl A.	Pending	2500	05/14/2008	N/A		NOAA/ES

○