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U.S. DEPARTMENT OF COMMERCE**

**ON THE
CONTINUING INDEPENDENT ASSESSMENT OF THE NATIONAL POLAR-
ORBITING OPERATIONAL ENVIRONMENTAL SATELLITE SYSTEM**

**BEFORE THE
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES**

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Introduction

Mr. Chairman and members of the Subcommittee, I am Mary Glackin, the Deputy Under Secretary for Oceans and Atmosphere of the National Oceanic and Atmospheric Administration (NOAA) within the Department of Commerce (DOC). I appreciate the opportunity to testify about the steps NOAA has taken over the past year to address the ongoing challenges with the National Polar-orbiting Operational Environmental Satellite System (NPOESS).

NPOESS – A National Asset for Weather and Climate Data

NPOESS is a tri-agency collaboration involving the NOAA, the National Aeronautics and Space Administration (NASA), and the Department of Defense (DoD). The NPOESS program is designed to deliver four operational satellites that will provide global weather and climate coverage from 2014 to 2026, along with the NPOESS Preparatory Project (NPP), which was originally intended as a risk reduction satellite for the program's advanced sensor technology, and is now scheduled to launch in 2011.

The NPOESS program, a pivotal national satellite constellation designed to meet the Nation's weather forecasting and some key climate monitoring needs, is at risk. Should delivery of the NPOESS satellites be delayed or a catastrophic failure occur on launch or in orbit, NOAA's forecasting ability would be severely degraded because current forecast models rely heavily on NOAA and NASA's polar orbiting satellites that will be coming to the end of their useful lives.

- While NOAA's weather forecasting ability can sustain gaps of less than six months by relying on older satellites, a larger gap in satellite coverage would be unacceptable for weather forecasting since NOAA would be unable to produce useful 4 and 5 day hurricane track forecasts. Overall, weather model forecast performance would degrade by approximately 10 percent, a regression back to the quality that existed in the late 1990s.

- A gap in satellite coverage of any length would most likely interrupt critical climate measurements that are needed for the Nation to determine the cause, magnitude and direction of future climate change.

NOAA's final satellite in its Polar Operational Environmental Satellite (POES) series, NOAA-19, was launched in February 2009 and declared operational earlier this month. NOAA also operates the Air Force's Defense Meteorological Satellite Program (DMSP) satellites, a program that continues to have two satellites awaiting launch. Given that NOAA does not have any further polar satellites remaining to be launched, the agency is particularly focused on the threat further delays in the NPOESS program and the threat launch or early-on-orbit failures may have on the crucial weather and climate forecasts NOAA provides to the Nation.

The NPOESS program has the potential to provide crucial information to our continued monitoring of the climate both nationally and globally. Both Secretary of Commerce Locke and NOAA Administrator Lubchenco have indicated their commitment to fix this program to better ensure the future of the nation's weather forecasting and climate monitoring capability.

Steps Taken to Reduce Risk in NPOESS Program

Since NOAA last testified about the NPOESS program last June, the agency has taken a series of steps to address the continued technical and management challenges in the program. The following section provides a summary of these steps in chronological order.

Working in partnership with DoD and NASA, NOAA has begun to address the challenges facing the program. Given the recent completion of crucial independent reviews, NOAA is seeking to move quickly to resolve remaining program issues.

A. Government Program Manager Installed at Contractor Facility

To address ongoing technical problems in the development of the Visible/Infrared Imager/Radiometer Suite (VIIRS), the main imaging sensor for the system, the NPOESS Executive Committee (EXCOM) agreed in August 2008 to have a government program manager with the expertise to oversee its development. Working in partnership with the existing prime contractor team from Northrop Grumman, as well as the subcontractor team from Raytheon, the senior NASA engineer and manager was installed on site at the Raytheon plant in El Segundo, California.

Since the government program manager's start at the facility, she has assessed the development of the VIIRS sensor being developed for NPP as well as those to be built for NPOESS C1 and later NPOESS spacecraft. She is leading the continued testing of the VIIRS instrument with a team of government experts, providing significant oversight on day-to-day testing and quality assurance processes.

B. Tri-Agency Joint Assessment Team Established by NPOESS Executive Committee

As a result of the continued VIIRS development difficulties in 2008, the EXCOM chartered the Tri-Agency Joint Assessment Team (TJAT) last fall to address the impacts to schedule and cost

that these ongoing development problems were causing. Consisting of senior officials from NOAA, NASA, DoD, and Air Force, the TJAT determined the following:

- The best solution to maintain overall program data continuity is to use NPP data operationally.
 - NOAA has accelerated the development of additional environmental data products so NPP is able to produce all of the products that NPOESS C1 was expected to produce (additional 35 data products).
- The program should proceed to plan to procure an Advanced Very High Resolution Radiometer (AVHRR), the main imaging sensor on NOAA's POES satellites, as an option if the program is unable to deliver VIIRS.
 - The AVHRR does not meet the full set of VIIRS operational requirements. There is also no funding available currently to implement this option.
 - The VIIRS sensor is currently undergoing thermal vacuum testing that will continue through August. If the sensor successfully proceeds through this testing, the option to procure an AVHRR will not be required.
 - The EXCOM directed the NPOESS Integrated Program Office (IPO) to complete the necessary procurement planning in the event VIIRS thermal vacuum testing problems require the program to proceed to procure an AVHRR.

C. Alternative Management Studies

The June 2006 Acquisition Decision Memorandum directed NPOESS to "...develop the option for a viable competing management structure..." to provide the EXCOM with a possible alternative to be exercised when the decision is made in FY 2010 on whether to continue with the same contractor team for the production of NPOESS satellites C3 and C4. The Alternative Management Study (AMS) was commissioned by the NPOESS Program Executive Officer (PEO) to assess management structure options.

An AMS was conducted in 2008 and made recommendations to improve program and sensor development oversight, fill key government positions, and implement contingency planning. It did not identify a viable alternative to the existing satellite integrator, or prime contractor, on the program. Their program oversight recommendations were addressed by creating an NPOESS Program Executive Officer-Program Management Council (PEO PMC), a monthly conference of tri-agency officials to support decision-making on the data requirements, acquisition, operations, and resourcing of the NPOESS program. Likewise, VIIRS oversight recommendations were addressed by deploying a government program manager and government support team to work on-site at the Raytheon subcontractor facility to provide additional oversight on VIIRS sensor testing and development.

D. Independent Review Team

At the request of the tri-agency leadership of the EXCOM, a high-level Independent Review Team (IRT) composed of senior independent aerospace and science experts from industry, academia, and government, concluded a comprehensive review of the program this spring. Chaired by Tom Young, the recently released IRT report provides valuable findings and recommendations regarding the current state of the program.

When the IRT findings were initially reported to the EXCOM, the IRT was clear that the NPOESS program “cannot be successfully executed within the constraints of cost, schedule, performance, and with the current management construct.”

NOAA is taking the team’s grim assessment of the program very seriously and is working with DoD and NASA to respond to the recommendations and make the changes necessary to improve the management and technical oversight of the program. Since Tom Young is expected to testify in his role as IRT Chairman at this hearing, this testimony will not summarize each of the team’s findings and recommendations.

NOAA, in partnership with DoD and NASA, is approaching the response to the IRT findings and recommendations through three major areas:

- the management of the program,
- the satellite coverage and data continuity challenges in the program, and
- the budgeting of the program.

The IRT noted they believe some NPOESS issues “can only be resolved at the White House level,” given the interactions they had with government officials that indicate the agencies have differences in how they propose to address key challenges in the program. The Office of Science and Technology Policy has begun to engage the tri-agency leadership to resolve the differences and implement actions to respond to the IRT’s recommendations.

Management:

NOAA, DoD, and NASA are working to address the management challenges in the program through a consideration of all of the IRT’s recommendations, but particularly the following four (out of nine):

- Focus on mission success (not on cost);
- Fix the Executive Committee/oversight structure;
- Assign the development management responsibility of NPOESS to a space acquisition enter; and
- Resolve and establish clear program priorities.

NOAA, DOD and NASA have been developing and considering management alternatives to reformulate the NPOESS tri-agency relationship in response to IRT recommendations. The options being considered include:

- a. Maintain the existing tri-agency partnership with management improvements and additional budget reserve.
 - Under this option, the current tri-agency program structure would remain in place, but the budget and schedule would be adjusted to allow the program to address continued technical challenges.
 - Under this option, the NPOESS program office could be transferred to NASA’s Goddard Space Flight Center in Greenbelt, Maryland or Air Force’s Space and Missile Systems Center in Los Angeles, California, to enable it to use the resources of one of these renowned space acquisition centers.

- b. Establish NOAA-NASA as national lead for delivering a satellite system that provides weather and climate data.
- Under this option, NOAA, in coordination with NASA as its acquisition lead, would have responsibility for delivering a system that fulfills the NPOESS requirements.
 - NOAA and NASA would be responsible for designing and implementing an improved system to reduce risk of weather and climate data gaps.
 - DoD would continue to provide funds at a to-be-determined level, and all agencies would still coordinate on the data requirements for each agency's user communities.
 - The NPOESS program office would be transferred to NASA's Goddard Space Flight Center in Greenbelt, Maryland, to enable it to use the resources of this renowned space acquisition center.
- c. Establish DoD as national lead for delivering a satellite system that provides weather and climate data.
- Similar to the previous option, DoD would have responsibility for delivering a system that fulfills the NPOESS requirements.
 - The DoD would be responsible for designing and implementing a system to reduce risk of weather and climate data gaps.
 - NOAA would continue to provide funds, and all agencies would still coordinate on the data requirements for each agency's user communities.
 - The NPOESS program office would be transferred to Air Force's Space and Missile Systems Center in Los Angeles, California, to enable it to use the resources of this renowned space acquisition center.
- d. Divergence of the NPOESS program into two separate agency programs (one DoD, one NOAA)
- Under this option, each agency would be responsible for acquisition of assets supporting its mission in its own priority orbits, similar to how the NOAA POES and Air Force DMSP programs currently operate.
 - Data sharing between the agencies would continue as it does today.
 - Existing partnerships for satellite operations, data distribution, and launch service would be continued.
 - While dependent on when such a structural change would occur, this option would require NOAA, DoD, and NASA to negotiate which agencies would receive the assets that have already been developed by the NPOESS program.
 - New competitive procurements for individual NOAA and DoD systems may be required shortly after such a divergence decision is made, potentially in FY 2010 or FY 2011 if decision is made in the near term.

The NPOESS tri-agency partners are continuing to assess and develop cost estimates for these options.

Satellite Coverage and Data Continuity:

NOAA, DoD, and NASA are working to address the challenges of satellite coverage and data continuity in the program through consideration of all of the IRT's recommendations, but particularly the following four (out of nine):

- Proactively manage and mitigate the potential gap in continuity of coverage,
- Continue and strengthen the relationship with Northrop Grumman and Raytheon;
- Use NPOESS Preparatory Project data operationally; and
- Resolve and establish clear program priorities.

NOAA, NASA, and DoD have been considering ways to modify and adjust the current planned NPOESS constellation of satellites to better mitigate potential gaps in coverage as well as better address each NPOESS agency's need for environmental data. The agencies are examining initially the following areas to adjust the constellation to help make the program more successful:

- Alternatives for the currently undeveloped portions of the ground system;
- Alternative sources for the currently undeveloped Microwave Imager/Sounder (MIS) sensor;
- Alternatives for the structure of the primary spacecraft; and
- Use of a series of small satellites and inclusion of sensors on commercial spacecraft, both of which may improve the tri-agency's ability to recover from launch or on-orbit failures.

Some of these options would require modifications to contracts and additional resources. Some of the options may reduce the capability of the NPOESS system.

Budget:

NOAA, DoD, and NASA are working to address the budget challenges facing this program through consideration of all of the IRT's recommendations, but particularly the following three (out of nine):

- Proactively manage and mitigate the potential gap in continuity of coverage;
- Increase near-term funding; and
- Fund the program by fiscal year and through the duration of the program at an 80 percent cost confidence level, including a management reserve of 25 percent.

Continuing development problems have consumed the program's resources and forced the program to make difficult trades to preserve schedule and remain within available annual funding. Unfortunately, these trades have added substantial risk to the program. In the near term, the program will likely require increased budget to meet the nation's needs, or have to reduce program scope to better align the program with its available budget.

In response to this concern, NOAA allocated \$26 million of American Recovery and Reinvestment Act funding for NPOESS, including funding above its matching requirement with DoD. This additional funding will allow NOAA to perform critical NPOESS development activities and address risk mitigation within the program.

Based on the four above major steps the NPOESS program leadership has taken recently, the program is on an initial path to resolve some of its current challenges. Additional work by the government is required to resolve the issues and the program intends to continue to keep the Committee apprised of these developments.

Government Accountability Office Recommendations for Executive Action

The Government Accountability Office (GAO) has provided regular reviews of the NPOESS program and NOAA appreciates the perspective GAO professionals have provided. NOAA has met with GAO and provided information and feedback on its most recent report.

GAO made six recommendations that it anticipates will improve the effectiveness and efficiency of the EXCOM. The first recommendation was directed solely to DoD and the remaining five recommendations are directed to DOC/NOAA, DoD, and NASA.

Recommendation 1: *To improve the timeliness and effectiveness of acquisition decision making on the NPOESS program, we recommend that the Secretary of Defense direct the Under Secretary of Defense for Acquisition, Technology, and Logistics to attend and participate in NPOESS Executive Committee meetings.*

NOAA Response: NOAA defers to the DoD on this recommendation but has no objection to EXCOM participation by the Under Secretary of Defense for Acquisition, Technology and Logistics.

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

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

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

NOAA Response: NOAA concurs with this recommendation. The NPP sensors are capable of producing data that meet or exceed the data provided by NOAA-19 (NOAA's current operational satellite). Accordingly, to mitigate the potential gap in polar environmental satellite data coverage in the afternoon orbit between NOAA-19 and NPOESS C1, NOAA plans to make operational use of the data from the NPP spacecraft and increase the number of products NOAA had planned to generate from the NPP system as a risk reduction mission to minimize impacts to NOAA's National Weather Service and other users.

Specifically, NOAA will accelerate development of 54 polar legacy products. Previously, 19 legacy products were expected from NPP, with an increase to 54 products in the NPOESS C1 era. NOAA will enhance its NPP data processing ground system with sufficient infrastructure to support the additional 35 products and 24x7 operations and support.

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

NOAA is assessing the use of additional international and interagency assets as well as potential development of spare satellites and instruments. The cost and schedule details associated with these contingency options are currently under review. Any alternative decisions will also take into account the results of the VIIRS sensor testing currently underway.

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

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

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

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

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

NOAA Response: NOAA concurs with this recommendation. The PEO will ensure that risks, resolution plans and schedules are established and tracked at the PEO-PMC, the PEO's monthly management council. NOAA will work with NASA and DoD to ensure the PEO establishes clear criteria and timeframes for elevating risks to the EXCOM for action. NOAA will monitor PEO action items and issue resolution through the NOAA Program Management Council and the tri-agency NPOESS Oversight Council (NOC) to take corrective actions needed to ensure timeliness in addressing escalating risks.

The NOC, established in the spring of 2009, is the tri-agency council that reviews the NPOESS program on a more recurrent basis than the senior-level EXCOM. The NOC, which reports to the EXCOM, is co-chaired by the Deputy Under Secretary for Oceans and Atmosphere, the Deputy Under Secretary of the Air Force, and the Deputy Administrator of NASA. These

members are responsible for representing their agencies and providing a reasonable representation of their EXCOM position to ensure that issues and actions are responded to in a timely manner.

Conclusion

In conclusion, NOAA appreciates the Committee's continued interest in the success of the agency'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. NOAA is acting quickly to support the important decisions that are likely required to modify the program to more effectively achieve its objectives in line with the recommendations of key independent reviewers. DOC and NOAA remain committed to pursuing a program that will provide continuity of data for the Nation's weather and climate prediction needs. I would be happy to answer any questions you may have.