

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

HEARING CHARTER

**Continuing Independent Assessment of the
National Polar-Orbiting Operational Environmental Satellite System**

Wednesday, June 17, 2009

2:00 - 4:00 P.M.

2318 Rayburn House Office Building

Purpose

The Subcommittee on Investigations and Oversight meets on June 17, 2009, for further oversight of the National Polar-Orbiting Operational Environmental Satellite System (NPOESS). The Subcommittee will receive the newest report on the program produced by the Government Accountability Office (GAO) and the findings from the Independent Review Team (IRT) examining the program. NPOESS has been the subject of sustained oversight as the risk that critical weather data might be lost has grown. At this hearing, the Subcommittee will consider alternative steps to limit the continuing deterioration in NPOESS program management and maintain the present schedule of satellite launches.

Program Description

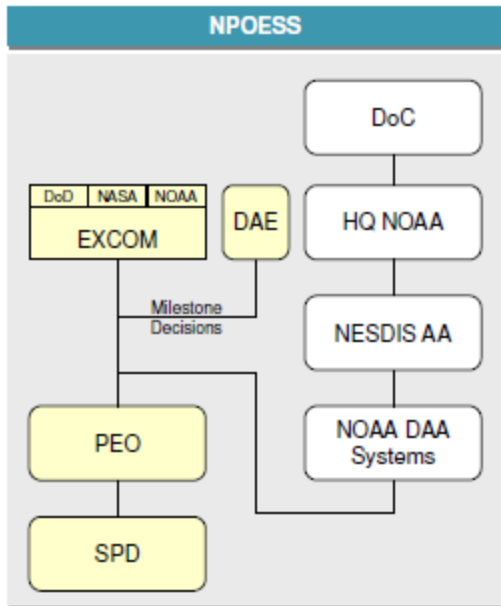
In 1993, the decision was made to bring together the Defense Meteorological Satellite Program satellites operated by the Air Force and the Polar Operational Environmental Satellites run by NOAA, thereby creating the NPOESS program.¹ These satellites were intended to meet needs for weather data by the military services as well as NOAA's National Weather Service. NPOESS also offered the opportunity for NOAA and NASA to assure continuity of the climate data that both agencies are collecting. The Committee's work has shown that the benefits expected from NPOESS have failed to materialize. Instead, the agencies find themselves at risk of losing the flow of global data on weather conditions and climate change that are critical to serving the needs of the United States.

The Committee has held five hearings on the NPOESS program since 2003, documenting cost overruns and schedule delays. A recurring issue has been the ineffectiveness² of the program's Executive Committee (EXCOM), which consisted of the heads of the three agencies involved:

- the Administrator of NOAA,
- the Under Secretary of Defense for Acquisition, Technology and Logistics (who delegated responsibility for EXCOM activities to the Secretary of the Air Force); and
- the Administrator of NASA.

¹ GAO in its report provides a more detailed description of the usefulness of satellites in polar orbits.

² In 2005, frustrated by NOAA's inability to respond to the deteriorating conditions within the program, Representatives Gordon and Wu called for the removal of NOAA's Administrator and his deputy. Then-President Bush declined to take that step.



At left is a diagram of the NPOESS management structure (left column) established in response to the so-called Nunn-McCurdy recertification³ in 2005. A System Program Director (SPD) was placed in charge of the Integrated Program Office (IPO) handling the day-to-day program oversight. A Program Executive Officer (PEO) became the direct liaison to the EXCOM. This was to simplify reporting information to the EXCOM and execution of resulting decisions.

With the reassignment of the first PEO, Air Force Brigadier General Susan Mashiko, the EXCOM sought a replacement and ultimately settled on her System Program Director, Dan Stockton. In assuming his new position, Mr. Stockton retired from the Air Force and became a NOAA employee. The new System Program Director, Ed Phillips, also transitioned from the Air Force to a NOAA civil service position. As a result, they also serve within the Department of Commerce management

structure (right column), communicating through the National Environmental Satellite Data and Information Services (NESDIS) division of NOAA.

According to the reports to be presented at this hearing, this management structure is still failing to provide the leadership needed for NPOESS program success. This leads to the obvious question: Is there hope of repairing the flaws in the organization? If not, what should replace it?

Witnesses

*Mr. David Powner, Director, Information Technology Management Issues
Government Accountability Office (GAO)*

Mr. Powner is the head of the GAO team 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.

Mr. Tom Young, Chair, NPOESS Independent Review Team (IRT)

Mr. Young served as the president of the Martin Marietta Corporation until its merger with Lockheed Corporation; he then served as executive vice president of Lockheed Martin until retiring in 1995. Mr. Young also served as director of NASA's Goddard Space Flight Center earlier in his career. In recent years, he has lent his expertise to numerous program reviews and mishap investigations in the space program. He testifies today as chair of the Independent Review Team constituted by the NPOESS Executive Committee (EXCOM) to offer advice on recovering from the severe technical and managerial problems in the program.

³ As set forth in the Memorandum of Agreement governing the NPOESS program, the Air Force is managing the acquisition of the satellites. It is therefore subject to Department of Defense regulations for major defense programs. When such programs exceed approved baseline costs by more than 25 percent, recertification is required by 10 U.S.C. 2433 *et seq.*

*Ms Mary Glackin, Deputy Administrator
National Oceanic and Atmospheric Administration (NOAA)*

The NPOESS program is fundamental to NOAA's weather missions, and was also expected to contribute to the agency's monitoring of climate and space weather phenomena. During the transition to the Obama Administration, Ms. Glackin has served as NOAA representative to the EXCOM, and has been coordinating with representatives of NASA and the Air Force to deal with the problems that continue to beset the program. Ms. Glackin has been asked to provide NOAA's responses to the reports prepared by the previous witnesses. She will also describe the progress of discussions now underway to plot a future course for the program.

Background

A. Helping NPOESS Succeed

The NPOESS program exists to collect data needed by NOAA, DOD and NASA to forecast weather, help military units minimize weather impacts on operations, and understand the influence of Earth's climate. According to the IRT report, however, the "customers" have very different views on "how much is enough." DOD is quite satisfied with the performance of those instruments currently flying and sees little need for significant investments in improvements. For NOAA and NASA, on the other hand, such improvements are needed to achieve their mission goals. The IRT states, "*These differences are straining interagency relationships and are impacting how people do their jobs, even down to the lowest levels of the IPO. **The IRT believes that this program will not survive if this particular problem is not addressed immediately.***" [emphasis added] The IRT follows with the statement that this "...*can only be resolved at the White House level.*"

Whatever decision the White House makes on the question of what NPOESS will do bears heavily on one of the major recommendations the IRT offers as part of its "Path Forward." The Team states that the program needs support from the space system experts at either NASA's Goddard Space Flight Center or the Air Force Space and Missile Command. The team believes that, given the fact that NPOESS is critical to NOAA's mission areas, NOAA should recast the program to work with Goddard much as it is doing with the Geostationary Operational Environmental Satellite upgrade (GOES-R). However, if the White House defines the NPOESS program to be more in line with the DOD view that NPOESS is little more than a replacement for the current polar-orbiting satellites, then either organization would be acceptable. Whatever the case, the present Integrated Program Office would continue in some fashion and would be expected to work closely with whichever organization is selected. The Committee's interest in NOAA and NASA activities argues for support of the IRT's preference for a NOAA-NASA partnership. Mr. Young also emphasizes that full control of the program resources must be vested in the revamped acquisition organization.

The IRT also believes that the current contractors should be retained. In the Nunn-McCurdy restructuring, studies were begun to determine if the prime contract with Northrop Grumman should be changed or terminated. These studies criticized Northrop Grumman and the Raytheon Space and Airborne Systems team building the Visible/Infrared Imaging Radiometer Suite (VIIRS) for poor performance. The Independent Review Team received detailed presentations on the results from these studies, which concluded that Northrop Grumman, at least, had made progress in addressing its shortfalls. Therefore, the disruption caused by finding a replacement was not warranted. The IRT team also recommends retaining Northrop Grumman. However, the award fee plan for the contract should be changed to focus on mission success.

The IRT also recommended that the government press forward with Raytheon to obtain the VIIRS instrument, although it could not determine how much longer it would take or how much it will ultimately cost. Replacement options should be limited to obtaining another unit of the existing

Advanced Very High Resolution Radiometer (AVHRR) imager now in use should the VIIRS unit fail during its remaining test or integration processes.

The IRT notes that the program is still operating with insufficient funds to achieve the outcomes it is pursuing. Correcting this will be another outgrowth of the White House decision process, in that more funds will have to be found or something will have to be dropped. The IRT estimates that accomplishing the current program plan will require an additional \$1 billion, which matches GAO's view (see section C, below).

B. What About EXCOM?

Previous hearings have examined the role and performance of the Executive Committee, which serves as the senior level of management for the NPOESS program. In the Committee's 2005 hearing, Mr. Gordon (then Ranking Member) had a sharp exchange with NOAA Administrator Conrad Lautenbacher about the flow of information to the EXCOM and the slow pace of EXCOM meetings even as the program was suffering severe budget problems. In a hearing before the Energy and Environment Subcommittee in 2007, GAO described the laborious process the EXCOM undertook to get concurrence on the set of documents needed to implement the management, technical and budgetary changes resulting from the Nunn-McCurdy recertification decisions in 2006. A year later, Mr. Powner testified that the updated Memorandum of Agreement and the new program baseline had still not been signed by all of the three principals.⁴ The repeated inability to make even basic decisions led the Committee to ask GAO to focus attention on the EXCOM.

Mr. Powner will testify that, despite the efforts undertaken to repair the weaknesses in the EXCOM, "...it has not effectively fulfilled its responsibilities and does not have the membership and leadership it needs to effectively or efficiently oversee and direct the NPOESS program." Part of the problem involved the fact that while the Secretary of the Air Force was serving as DOD's EXCOM representative, he had no authority to make commitments for DOD. The Under Secretary of Defense for Acquisition, Technology and Logistics had not delegated authority to make commitments for DOD when reaching procurement milestones. As GAO noted, however, the Under Secretary did not attend EXCOM meetings, which contributed to the inability to gain approval on the Memorandum of Agreement and the program baseline.

Thus the situation continues, and indeed has fueled growing friction between the program participants. GAO's report illuminates this where it states:

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

GAO also described in its draft report that the EXCOM fails to make clear decisions and does not regularly determine if progress is being made on the tasks it has ordered to be accomplished. GAO found no mechanism for tracking EXCOM decision milestones. Compounding this lack of oversight, the decisions that have been made often did little to actually resolve the problem. This is most clearly seen in the continuing inability to bring the primary sensor, the Visible Infrared Imaging Radiometer Suite (VIIRS), to completion. Despite continued pressure on prime

⁴ On March 3, the EXCOM was notified that the accumulation of the most recent technical trouble with the VIIRS instrument required delays in the predicted launch dates for NPP and the NPOESS satellites. A new baseline was to be submitted by June 4.

contractor Northrop Grumman to achieve improved performance from Raytheon, the EXCOM has not been able to solve this major impediment to NPOESS progress.

Having been constituted by the EXCOM, Mr. Young's Independent Review Team proved diplomatic in its comments. Still, it raised concerns similar to those highlighted in GAO's report. As it concluded:

The EXCOM process is ineffective: The EXCOM is intended to be a decision body to provide streamlined direction to the PEO. The current DoD EXCOM representative has not been delegated the proper authority from the Defense Acquisition Executive (DAE), who is also the NPOESS Milestone Decision Authority (MDA), and decisions require an additional meeting and coordination to be finalized. Additionally, the IRT has observed that many of the topics that are discussed at the EXCOM delve too deeply into program details and many critical top level issues are left unresolved.

GAO recommends that the Under Secretary for Acquisitions, Technology and Logistics be directed to attend EXCOM meetings. It further recommends that the EXCOM devise a realistic timeline for revising the program baseline, develop a plan to mitigate data gaps and pay closer attention to the outcome from its decisions.

Mr. Young argues that the EXCOM should play a different role if the NPOESS program becomes a NOAA-NASA responsibility. In that case, the EXCOM will provide DOD continuing insight into the NPOESS program. While DOD believes its needs are being met by the current generation of instruments, it is also the case that users often cannot recognize benefits from new technology until they are presented real, not theoretical, products to evaluate. That is very likely to be the case with NPOESS. Mr. Young believes that the EXCOM will then serve as the forum by which DOD participates in the continuing evolution of data requirements for future systems.

C. Cost Increases and Schedule Delays

The NPOESS program has changed significantly since its inception in 1994. A fundamental restructuring took place in 2005 and 2006 as a result of the breach of cost ceilings defined by the so-called Nunn-McCurdy provision of DOD procurement law. The recertified program, announced in June 2006, provided for the following:

- 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**.
- 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.

In the past seven years, Committee hearings on the NPOESS program have documented a continuing rise in the program's life-cycle cost estimate and repeated delays in the expected launch dates for the satellites. Using Mr. Powner's statements at these hearings, the following table demonstrates the growing life-cycle cost and schedule delays:

Date	Life-Cycle Cost Estimate (billions)	Number of NPOESS satellites	Launch date, NPOESS Preparatory Project (NPP) satellite	Launch date, final POES satellite (NOAA 19)	Availability date, first NPOESS satellite (NPOESS C1)	Launch date, first NPOESS satellite
[Program Initiation 1994]	\$6.96	6				
[NGST contract award August 2002]	\$6.5	6	May 2006	March 2008	March 2008	April 2009
July 15, 2003	\$7.0	6	October 2006	March 2008	December 2009	November 2009
[Rebaselining 2004]	\$8.1	6	October 2006	March 2008		November 2009
November 16, 2005	\$9.7	6	April 2008	December 2007		September 2010
NUNN-McCURDY RECERTIFICATION (2005-2006)						
June 7, 2007	\$12.5	4	January 2010	February 2009		January 2013
June 19, 2008	\$13.5	4	January 2010			January 2013
June 17, 2009	\$14.9	4	January 2011	February 2009		March 2014

The \$14.9 billion estimate, according to Mr. Powner, includes some \$1 billion in additional costs for the sensor problems, possible information security upgrades and estimates for the operational costs for the last two years of the program's life. Thus, the program has doubled in cost and yet will result in fewer satellites. It should also be of concern that, despite the effort to reduce or eliminate risk in the NPOESS program, cost increases on the order of \$1 billion per year are continuing to occur.

During the 2005 Nun-McCurdy recertification, continuity of the existing data streams was the highest priority. As the Independent Review Team report notes,

While continuity of data is a critical priority for all users, it is at extreme risk: If all satellites are delivered on schedule, launched without incident, and meet their full design life, there will be no significant gap in capabilities. In keeping with historical trends, there is a high likelihood of early problems with the first few satellites. If NPOESS exhibits similar characteristics, there will be a minimum gap of several months. If there is a launch failure - a 41% chance of occurring over the remaining DMSP launches, NPP and NPOESS - there is a high likelihood of a gap measured in years....

NOAA's has assured data continuity by its policy of assuring spare satellites available for launch in case a satellite is lost at launch or fails prematurely. In the case of the geostationary program, NOAA provides a spare in orbit to reduce the time needed to respond to failure. This recently

proved important when the current Geostationary Operational Environmental Satellite covering the eastern United States (GOES-12) suffered problems. NOAA was able to place the existing spare, GOES-13, into service until it could restore GOES-12 to duty.

This policy for backup satellites was also provided in the original NPOESS program. Yet by the time NOAA launched the last of its polar satellites, NOAA-19, on February 6,⁵ the extreme risk identified by the IRT became concrete. NOAA is now dependent on NOAA-19 lasting at least for two years without incident, assuming that NPP achieves its planned launch in January 2011. NOAA has been fortunate in that it has not lost a satellite in a launch accident for some time. While it has been clear for some time that the NPP satellite would take on this "gap-filler" operational role, it also is designed for a four- to five-year lifetime. Should the first NPOESS satellite be lost,⁶ NPP would be expected to carry on well into the next decade. The second NPOESS satellite is intended to operate in the morning orbit, which is of primary interest to DOD. The risk is somewhat lower there as DOD still has three of its DMSP satellites in reserve.

D. Program Status

The NPOESS program last month completed a Critical Design Review on the NPOESS system. Northrop Grumman's program manager commented afterwards that, "*The team demonstrated that the majority of the detailed design is complete and meets requirements. NPOESS is at a higher level of design maturity than typical at this milestone as a result of building sensors and ground elements for the NPOESS Preparatory Project...*" The Government's System Program Director reported to the EXCOM on May 22 that the consensus favored going forward with the first NPOESS satellite, but with important qualifications:

- *NPOESS satellite integration and test schedule is high risk*
- *4% (16/458) of the non-KPP (Key Performance Parameter) attributes do not meet specification*
- *Compliance to baseline design depends on unapproved changes*
- *Government Furnished Equipment (GFE) sensor design insight and maturity is lacking*

Open items from the Review are expected to be resolved by August.

The Visible Infrared Imaging Radiometer Suite (VIIRS) instrument, which has been the critical pacing item for some time now, is now undergoing critical thermal-vacuum testing to determine if it can withstand the conditions it will face during operation. The Cross-Track Infrared Sounder (CrIS) is progressing through the steps needed to restore the instrument following failure of the frame during vibration testing. Screws in one element of the Ozone Mapping and Profiler Suite (OMPS) will be replaced to assure they were properly tightened. Funding from the NOAA's allocation in the American Recovery and Reinvestment Act has been used to assure that the Total Solar Irradiance Sensor (TSIS) and Earth Radiation Budget Sensor (ERBS) will be able to fly on NPP, thus avoiding gaps in critical climate data collections.

The Integrated Program Office has also been contributing to efforts currently underway in the NPOESS agencies to assist the White House in responding to the recommendations from the two reports to be discussed at the Subcommittee's hearing.

⁵ NOAA-19 was substantially rebuilt after it was dropped on the floor September 6, 2003 at the Lockheed Martin production facility. NOAA has regularly assured the Committee that all damage has been completely repaired.

⁶ The change to operational status affects primarily the ground system, as NPP was originally intended to provide data only to NOAA and one of three military forecasting centers. The satellite will now serve all four centers.