

**WRITTEN TESTIMONY OF
MARY E. KICZA
ASSISTANT ADMINISTRATOR FOR
SATELLITE AND INFORMATION SERVICES
NATIONAL ENVIRONMENTAL SATELLITE,
DATA, AND INFORMATION SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE**

**OVERSIGHT HEARING ON
GEOSTATIONARY OPERATIONAL ENVIRONMENTAL SATELLITES:
PROGRESS HAS BEEN MADE, BUT IMPROVEMENTS ARE NEEDED TO
EFFECTIVELY MANAGE RISKS**

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

OCTOBER 23, 2007

Introduction

Mr. Chairman and members of the Subcommittee, I am Mary E. Kicza, Assistant Administrator of the National Environmental Satellite, Data, and Information Service (NESDIS). NESDIS is part of the National Oceanic and Atmospheric Administration (NOAA), within the Department of Commerce (DOC). I appreciate the opportunity to discuss with you today NOAA's environmental satellite programs and to highlight their importance to our hurricane and other severe weather forecasting and warning capabilities. NOAA has made significant progress in the development of the next generation Geostationary Operational Environmental Satellites R Series (GOES-R) program since the September 29, 2006 hearing.

NOAA's satellite acquisitions are complex and difficult development efforts. I will be the first to acknowledge that NOAA does not have a strong track record with regard to recent satellite acquisition development efforts. We appreciate the Government Accountability Office's (GAO's) recognition that, in the GOES-R acquisition, "progress has been made." NOAA is working hard to prevent schedule and budget problems from occurring in our satellite programs. We have implemented several changes to strengthen the review, cost estimating and program control processes within our satellite development programs in response to lessons learned from programs including the National Polar-orbiting Operational Environmental Satellite Systems (NPOESS) and from the recommendations of outside reviewers, such as the GAO.

We value the GAO's reviews of GOES-R. In fact, GAO's recommendations place emphasis on some areas where NOAA is already proactively engaged: obtaining an independent cost estimate and reconciling differences with the program cost estimates; assuring that we are paying proper attention to managing risk; and putting in place protocols similar to those used by the National Aeronautics and Space Administration (NASA) for milestone decision points for satellite

acquisition programs. We thank the GAO for its recommendations and look forward to its continued review of the program.

What are Geostationary Satellites?

NOAA has operated geostationary operational environmental satellites (GOES) since the 1970s. These satellites are located more than 22,000 miles above the equator and provide near continuous images and data on atmospheric, oceanic, and climatic conditions over the continental United States and Hawaii. These satellites are best known for creating the hurricane pictures you see on television, but they also provide the data to help forecast the weather and are critical to detecting and tracking severe weather. Advances in hurricane prediction depend not only on improved observations such as those from satellites, but also on improved data assimilation, computer models, and continued research to better understand the inner workings of hurricanes.

We operate two geostationary satellites, one over the east coast and the other over the west coast. To protect against a loss of satellite coverage, we maintain a spare satellite in space that can be repositioned and brought out of storage in a matter of hours to take the place of a failed satellite. Given the importance of these satellites, continuity of operations remains our highest priority.

What is GOES-R?

Individual GOES satellites have a letter designation through their development until they are launched, placed in orbit, and have completed a rigorous checkout procedure. They are then given numeric designations for their operational lifetimes. The operational satellites in space now, GOES-11 and GOES-12, are the last two satellites of the GOES I-M series. The next series of geostationary satellites is called GOES-N, and this series consists of the same instruments as the GOES I-M series. The first of the GOES-N series satellites was launched in May 2006 and is currently serving as the on-orbit spare. The final two satellites from this series — GOES-O and GOES-P — are already built and will be launched over the next several years. We are still in the preliminary design phase of development for the next generation of GOES satellites, called GOES-R, which will ensure uninterrupted satellite data continuity when the GOES-N series ends. Current assessments indicate that GOES-R must be launched at the end of 2014 to provide continuous geostationary data. The GOES-R series will include advancement beyond the GOES-N series, particularly in instrument capability. GOES-R will provide forecasters and scientists with a new suite of greatly improved instruments. These new instruments will enhance our current capability to track and monitor severe weather on Earth with greatly improved imagery and scan rates. Solar environmental monitoring instruments will provide a significant advance for space weather forecasting.

We have committed, during the preliminary design phase of GOES-R, to thoroughly examine the program to confirm its readiness to proceed into the acquisition phase. This has involved changing the management and acquisition strategy, implementing regular senior NOAA and NASA reviews of the program, and subjecting the program to independent review and cost estimates. These efforts are yielding valuable results by identifying areas that require additional attention and providing the appropriate resources to address those areas. We believe we are on a sound track going forward.

Status of GOES-R

During 2006 and 2007, NOAA and NASA conducted a top-to-bottom review of the program with input from an Independent Review Team of senior satellite acquisition experts, the user community, and reports from the three preliminary design contractors. These efforts led to a revision of our plans to ensure we have a program that maintains data continuity, allows for technical advances, and is affordable. Specifically, we had to acknowledge that to actually build our concept for GOES-R would be much more expensive than we first thought. As a result, we made the decision not to award a contract to build the Hyperspectral Environmental Suite given its risk and technological challenges. In addition we made a decision in March 2007 to change the program management structure to take advantage of the unique organizational expertise of NOAA and NASA. NASA has a long history of managing successful satellite acquisitions, while NOAA has a long history of developing successful ground systems for operational weather satellites. This change incorporated important lessons learned from other major systems acquisitions projects. Key elements of the new management strategy are:

- NOAA has overall program responsibility and total program funding.
- NASA manages development of spacecraft and instruments, and provides launch services.
- NOAA manages development of ground systems and operates the system on orbit.
- NASA leads government systems engineering, integration activity and mission assurance.
- For each of the GOES-R program projects (ground, flight, and integration) NOAA and NASA partner closely, with NOAA staff providing direct support (i.e., as deputy program managers) to NASA-led elements, and vice versa.

We also changed our acquisition strategy to align with the new management strategy by replacing the single, prime contract approach with two primary contracts, one for the space segment and one for the ground segment. The combination of the new management and acquisition strategy will reduce program risk and maximize our potential for fielding a high performing satellite system on schedule and within budget. To document this management change and other major aspects of the program, NOAA and NASA signed a Memorandum of Understanding in June 2007 and will shortly implement detailed operating procedures documented in the GOES-R Management Control Plan (MCP). The MCP, patterned after a NASA Program Plan, will implement the current NOAA/NASA program management practices and guide responsibilities of NOAA and NASA for the GOES-R Program.

NOAA has benefited from the 2005 decision to create a jointly staffed NOAA/NASA program office at the Goddard Space Flight Center. Prior to 2005, NASA conducted all of GOES acquisition activities for NOAA, and NOAA maintained a small liaison staff at the Goddard Space Flight Center. Collocation of NOAA and NASA program personnel at the Center facilitates communication between the flight and ground projects, permits effective joint program systems engineering and integration, and encourages a collaborative NOAA/NASA team environment. NOAA and NASA personnel work side-by-side. The overall GOES-R program management team has access to the satellite acquisition expertise and experience in place at Goddard Space Flight Center, including engineering and program management reviews of GOES-R.

Status of Spacecraft and Ground System Acquisition

To prepare for the 2008 spacecraft source selection, a joint NOAA/NASA team is reviewing industry responses to a draft Request for Proposals (RFP) received in mid-September. The

spacecraft project has successfully concluded the review which allows the Request for Proposals to go forward. We are now in the process of finalizing the RFP. At present, four instruments are currently in the implementation phase, one (the geostationary lightning mapper) is nearing implementation and the sixth (the magnetometer) will be procured as part of the spacecraft acquisition. Instruments will be delivered to the spacecraft contractor as government-furnished equipment for integration on the spacecraft. Appendix 1 provides a list of the instruments and their status.

The ground project is nearing completion of the reviews necessary to allow the project to go out for proposal. We anticipate a draft RFP for the ground segment will be released in January 2008. NOAA and NASA are working towards releasing the final spacecraft and ground RFPs in early 2008. NASA and NOAA will release the final spacecraft and ground RFPs following appropriate NASA and NOAA/DOC reviews and approvals.

Since the GAO issued its report in September 2006, the Independent Review Team has met twice to provide recommendations to NOAA concerning program readiness for the acquisition phase. The GAO's most recent report indicates that, while NOAA and NASA are taking the right steps to put together a sound GOES-R Program, there is still work to be done before proceeding into the acquisition phase, especially in the ground system. Identifying and addressing issues before the acquisition phase begins is a key lesson learned from the NPOESS program. Once we begin the acquisition phase and the contracts are in place, the workforce engaged in implementing the program ramps up sharply. Fixing problems during the acquisition phase is more costly given the larger workforce involved. That is why it is so important to take the time to identify and address the problems during the program definition phase. We want to enter the acquisition phase with a program that will succeed with all risks appropriately identified and tracked.

Status of the Cost Estimate

NOAA has hired outside experts to develop the program cost estimates. This cost estimating team works for the GOES-R program office and is developing the Program Office Estimate. In addition, we have hired an independent team to examine the Program Office Estimate. This independent team works for the NOAA Chief Financial Officer and has provided an Independent Cost Estimate. The Independent Cost Estimate group and the GOES-R Program are actively working to clarify assumptions and understand the differences in the cost estimates developed through their review.

The GAO Report

GAO has provided regular reviews of our GOES-R Series acquisition for many years and we appreciate the perspective that the GAO professionals provide. We have met with GAO and provided information and feedback on its most recent report. I will summarize this information for you today.

I am pleased that the GAO report recognizes we have taken steps to apply the lessons learned from other satellite programs to the procurement of GOES-R. I understand we have more work to do to improve the overall management of these complex and high risk programs, and the joint NOAA/NASA team is fully committed to making further improvements.

Specifically, the GAO provided two recommendations related to program-wide risk:

Recommendation number one: *Ensure that the GOES-R Program Office manages, mitigates and reports on risks using a program-level risk list that is reconciled with and includes risks from both flight and operations project offices that could impact the overall program.*

NOAA agrees with the recommendation and has directed the GOES-R Program Office to maintain a consolidated program-wide risk list and use this list in internal and external reviews of the program. The GOES-R risk management process includes regular review of project risks by the program and selective elevation of project risks at the program level for mitigation and management. The System Engineering and Integration Division of the GOES-R Program is responsible for maintaining the program risk list which is reviewed at least monthly by the GOES-R System Program Director. The GOES-R System Program Director briefs the NOAA Program Management Council monthly on the top risks and the strategies for resolving and closing them.

Recommendation number two: *Include the following risks on the program-wide risk list, develop plans to mitigate them and report to senior executives on progress in mitigating them:*

- *Unfilled or temporary GOES-R program leadership positions,*
- *Insufficient program insight on NASA contract performance, and*
- *Insufficient management reserve on the critical Advanced Baseline Imager instrument and at the GOES-R program level.*

NOAA agrees with the need to track the leadership positions and has a structured process in place to do so. The status of the filling these vacancies is reviewed at the monthly Program Management Council meetings. On an acting basis, the GOES-R program is being led by two highly qualified individuals with multiple years experience in satellite and major systems acquisitions. NOAA has requested that the NOAA Workforce Management Office expedite a nation-wide advertisement and search for a permanent GOES-R System Program Director.

NOAA realizes that to have the necessary insight into NASA contract performance it is not simply sufficient to have co-located and intermingled staff. That is why NOAA and NASA are drafting a comprehensive Management Control Plan that will establish the framework for Program and Project performance. NOAA will assure that the finalized Plan provides NOAA a sufficient degree of insight and guidance to meet NOAA's responsibility for mission success.

Finally, NOAA does not agree with the assertion that there are insufficient reserves on the Advanced Baseline Imager instrument and at the GOES-R program level. It is important to note that the funding level used by GAO as the baseline for this evaluation is not the same amount that NOAA actually budgeted for this instrument. NOAA budgeted more funding than the contract amount, and withheld the difference as a management reserve at the GOES-R program level, rather than in the specific instrument budgets. While at the time of the GAO review in March through August, the GOES-R Program had not allocated this management reserve to the projects, the reserve funding has now been allocated and is sufficient to manage the anticipated program risk. The GOES-R Program currently maintains reserves at the Program level and at the Flight and Ground Project levels. The System Program Director holds the project managers responsible for managing their projects and reserves. The current level of management reserve for the Advanced Baseline Imager at the program and project levels are sufficient.

While not a recommendation, GAO has asserted the following in the body of the report: “... *independent estimates are higher than the program’s current cost estimate and convey a low level of confidence in the program’s schedule. Independent studies show that the estimated program could cost about \$2 billion more, and the first satellite launch could be delayed by 2 years.*”

NOAA strongly disagrees with this statement and is currently working with the program and independent cost estimators to resolve the differences. It is critical that this assertion be put into its proper context. Early in the cost estimation effort, the program office and independent estimates were divergent in several areas due to differing assumptions, which is not uncommon for programs of the magnitude of GOES-R. Accurate comparison of the two cost estimates requires an assessment of each estimate’s ground rules and assumptions. Resolution of issues related to instrument design complexity, software scope, and inflation factors can have huge effects on revised estimates. As work with the independent estimator has progressed, we have resolved numerous differences in ground rules and assumptions and have seen the two cost estimates begin to converge. We expect to achieve even closer convergence as we continue to resolve the remaining differences in assumptions.

As with the two cost estimates, the reconciliation efforts associated with the schedule estimates have identified some key assumption differences that should result in some convergence in the schedule estimates. However, it should be noted that the two schedules essentially agree with each other (within the capability of current schedule estimating models to predict).

Conclusion

I appreciate the Committee’s continued interest in 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 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 a better process for designing and acquiring our satellites. We have fully 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. I would be happy to answer any questions you may have.

Appendix 1

GOES-R Instrument Status

- **Advanced Baseline Imager (ABI)**
 - Implementation phase
 - Contractor: ITT Corporation, Ft Wayne, IN

- **Space Environmental In-Situ Suite (SEISS)**
 - Implementation phase
 - Contractor: Assurance Technology Corporation, Carlisle, MA

- **Extreme Ultra Violet /X-Ray Irradiance Sensor (EXIS)**
 - Implementation phase
 - Contractor: Laboratory for Atmospheric and Space Physics, Boulder, CO

- **Solar Ultra Violet Imager (SUVI)**
 - Implementation phase
 - Contractor: Lockheed-Martin Advanced Technology Corp, Palo Alto, CA

- **Magnetometer**
 - To be procured as part of spacecraft contract

- **Geostationary Lightning Mapper (GLM)**
 - Contract to be awarded Fall 2007