

**WRITTEN STATEMENT OF
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**Oversight Hearing on National Polar-orbiting Operational
Environmental Satellite Systems**

**Before the Committee on Commerce, Science, and Technology
Subcommittee on Disaster Prevention and Prediction
U.S. Senate**

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Chairman DeMint, Ranking Member Nelson and distinguished members of the committee, thank you for the opportunity to discuss NPOESS, the National Polar-orbiting Operational Environmental Satellite System, with you today. My name is Dave Ryan, and I am vice president and NPOESS program director for Northrop Grumman Space Technology.

As you know, the nation is typically hit by over 10 tropical storms and 3 or 4 major hurricanes a year. Last year it was much worse costing the country great loss of life and well over \$100B.

NPOESS will be the nation's space-based, low Earth orbiting weather and environmental monitoring system, serving both civilian and military needs in the next decades. The nation currently obtains over 95% of its numerical weather forecasting data from satellite systems, and NPOESS will significantly improve our weather forecasting, far surpassing current capabilities. Weather predictions will typically be available within just 15 minutes of the satellite observation – a five to ten-fold improvement over current comparable systems.

NPOESS will be the system the nation relies on for measuring atmospheric conditions, ocean waves, and will play a pivotal role in providing more precise advance warning of hurricanes and other adverse weather conditions. NPOESS will empower our armed forces with real-time environmental information essential for their mission success and personal safety. Significantly improved imagery will

improve mission planning and weapons deployment. NPOESS will monitor climate and environmental changes and will be the system that we rely on to measure ozone in the atmosphere, the sun's irradiance, and the earth's radiation balance. NPOESS also will monitor space weather – a mission essential for support to commercial and military communications.

Disaster prevention and relief will benefit significantly from NPOESS. The system will provide targeted mapping of fire sources, even at night; more detailed data on floods to help rescue crews and relief planning efforts. NPOESS will carry search and rescue receivers to aid rescue workers in their ability to locate and rescue stranded hikers, hunters, and boaters. And in hurricane season, NPOESS will be able to much more accurately pinpoint the areas of severest weather, track wind direction and speed, and indicate safety zones for hurricane hunter aircraft. Lives and property will be saved, thus reducing the financial impacts of these disasters on the American people and industries such as fishing, farming, coastal commerce, and insurance, just to name a few.

Northrop Grumman is the prime contractor for NPOESS, and we are responsible for overall system design, integration, and for performance of the system. We are supported by a broad range of the nation's aerospace industry. More than 70 percent of the NPOESS program is subcontracted and a big part of our effort is managing those subcontracts. We and our subcontractors have approximately 1400 people working on the program in 15 states.

The program is currently in the Nunn-McCurdy certification process, and as prime contractor, we stand accountable for moving the program forward in a cost-effective manner. We are supporting multi-agency teams assembled by the Department of Defense to help define the optimum path forward, and during this certification process, we are also making very good progress on development of the system. We are currently ahead of schedule and on budget to the FY2006 plan.

Following the outcome of the Nunn McCurdy process, we expect to receive specific instructions from our customer on how to restructure this very large and complex program. In the meantime, we are working to a detailed 2006 Interim Program Plan that provides a firm foundation for forward progress.

The current program situation can be traced to four causes. 1) After being awarded the contract in August 2002, Northrop Grumman observed hardware design, manufacturing, and quality problems at some of the sensor suppliers. These problems led to significant cost and schedule overruns. Sensor cost growth accounts for approximately 80% of the current program cost growth. 2) Some sensors also grew significantly in weight and power. This growth in turn impacted our spacecraft design, and its cost and schedule. 3) In addition to the delays caused by the sensor issues, the program schedule was further lengthened when the increased costs bumped up against fiscal year funding constraints. This caused work to be delayed and further increased forecast cost. 4) Finally, this Fall we were asked to forecast program costs, assuming a high confidence program. Typically in the past, space development programs have forecasted costs at the equally likely probability. In forecasting a high confidence program, additional cost was forecasted to cover unknown problems that might arise in the future.

Northrop Grumman and our contractor team have responded to resolve the underlying issues that led to the requirement for Nunn-McCurdy certification. Northrop Grumman has intervened at the Visible Infrared Imaging Radiometer Suite (VIIRS) subcontractor by placing our specialists onsite to resolve significant technical, cost and schedule problems. We have also placed additional staff at other subcontractors, and have performed extensive audits. For example, we worked with the CMIS subcontractor to stabilize weight and power. This sensor's weight and power have now been stable for over a year, allowing the spacecraft design to move forward efficiently.

Significant changes have also been made in the program organization and staffing. We have a very senior NPOESS leadership team with an average of 28 years experience on similar programs. A Northrop Grumman Vice President, responsible for supplier performance, has been assigned as my deputy. Both our space segment and payload leads have been changed to better align talents with the current phase of the program. We have also performed independent executability reviews both internally and at our subcontractors and are applying the findings of those reviews throughout the program.

Let me give you a specific example from the VIIRS program, a sensor that has experienced significant technical, cost and schedule problems. Northrop Grumman intervened and re-located 10 specialists to be onsite at the subcontractor's facility to proactively assist them through the design and development process. The team has comprehensively reviewed their processes and their detailed design and has implemented corrective action across the subcontractor's engineering, manufacturing, quality, and management disciplines.

This intervention is paying off. The VIIRS subcontractor is currently ahead of the FY2006 schedule and has recently successfully completed some very important development unit environmental tests. The unit is meeting all of its key performance requirements and passed its vibration testing, a key test for this instrument. The sensor's passive cooling system, which consists of a cryo-radiator and other passive cooling elements, demonstrated better than required performance during recent thermal vacuum testing.

The development unit is now being readied for sensor-level thermal vacuum testing. Success in these thermal vacuum tests will further increase our confidence in this sensor.

Lessons learned from our experience with problematic sensor developments are now being applied across the program and are as follows:

1. The nation's supply base for sophisticated, operational, environmental sensors is fragile, and prime contractors must understand the capabilities of the supply base and proactively apply their own expertise to support the sensor provider.
2. Dependence on heritage is often overstated and primes must challenge and verify such claims.
3. Northrop Grumman has now instituted the practice of performing subcontractor capability assessments of any development activity transferred to NGST. NGST now also audits the criteria, analysis, products, and action closure of the last major design review of any development subcontract transferred to NGST. If the review process and products are inadequate, the review will be repeated.

4. Northrop Grumman's subcontract management practice is being further strengthened. Managing the development and production of sophisticated, high-reliability hardware at a subcontractor is challenging. In addition to the technical and logistic demands inherent in such hardware, managing through contract language, across corporate cultures and differing corporate motivations, and over geography adds significantly to the challenge. Although the processes employed by NGST's subcontract teams are now very good, they did not prevent or rapidly resolve issues inherent in several of the sensor subcontracts transferred to NGST. NGST had believed the sensor suppliers were capable of solving development issues primarily by themselves and did not immediately intervene when problems arose. Although NGST did provide significant technical assistance both to the subcontractors and to their suppliers, this assistance did not initially address the underlying systemic issues quickly enough. Now a proactive team of experts intervene at the first sign of trouble.
5. The Young Panel's recommendation that space program costs be determined at a high confidence level from the beginning, rather than at a lower "most likely" level should be adopted across the industry, given the risks inherent in new, large development space programs and in the development of new state-of-the-art technologies that comprise these space systems.

As a result, NPOESS has achieved success in many fronts. The ground data-processing segment, terrestrial communications network, and the much of the spacecraft design are moving smoothly through development, as are 10 out of the 13 sensors and communication payloads. Of the three sensors that we have had cost and schedule issues with in the past, currently all three are either on or ahead of the 2006 schedule plan. In June of 2005, we successfully completed the System delta Preliminary Design Review. This review confirmed the soundness of the overall technical design and confirmed that the system would achieve the required technical performance.

Northrop Grumman takes our responsibility very seriously as the prime contractor for this critical national asset. Once deployed, NPOESS will save lives and other precious national resources through greatly improved natural disaster prediction. You have my personal commitment and the commitment of Northrop Grumman that we will do everything possible to deliver this important mission to the nation. Thank you.

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