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Statement of
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before the

Subcommittee on Energy and Environment
Committee on Science and Technology
U.S. House of Representatives

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to appear today to discuss NASA's role and support to the National Oceanic and Atmospheric Administration (NOAA) for the Geostationary Operational Environmental Satellites R Series (GOES-R). The NASA Goddard Space Flight Center (GSFC) in Greenbelt, Maryland developed and launched the world's first weather satellite in 1960 called the Television Infrared Observation Satellite (TIROS). Designed to test experimental television techniques that would lead to a worldwide meteorological information system, TIROS demonstrated the benefits of studying Earth's weather systems from space. Today, NASA and NOAA share a 39 year partnership designing, developing and launching the GOES weather satellites. The GOES and Polar Operational Environmental Satellite (POES) series provide our Nation with the meteorological data for the weather observations, research, forecasting, and storm warnings that we have come to rely on. Through this partnership, NOAA and NASA are now implementing plans for the design, development and launch of the next generation geostationary weather satellite, the GOES-R series. These next-generation spacecraft will further improve our ability to observe and predict weather events and provide a means for the identification of severe storm conditions such as hurricanes and tornadoes.

NASA recognizes the importance of delivering missions on cost and on schedule, and developing clear and stable baselines. Developing scientific instruments, spacecraft, and new launch systems often requires that the Agency redefine state-of-the-art. Often, NASA is pushing the technology boundaries and must venture beyond our past experience and into an environment of uncertainty and higher risk. The GOES-R satellite series is a major improvement over the previous system and therefore it does come with some risk. Today my testimony outlines the steps NOAA and NASA are taking to minimize cost, schedule and performance risk on the GOES-R program and how NASA continues to fulfill the Agency's commitment to providing complete transparency to its program management activities to ensure the successful and timely delivery of the GOES-R series spacecraft.

Minimizing Cost, Schedule and Performance Risk

Effectively managing cost, schedule and performance risk requires the identification of the most vulnerable program areas. For the GOES-R program, NASA and NOAA identified the following areas: 1) requirements definition; 2) instrument development; 3) instrument interfaces; and, 4) contract oversight.

Developing well-defined mission requirements is the critical first step to any major system acquisition. NOAA and NASA took exceptional steps to fully define all requirements for the GOES-R space and ground segments. This included defining performance, interface, testing, quality assurance, and deliverable requirements. During the formulation phase, NASA worked with NOAA to define and refine the instrument performance requirements. These requirements flow down to NASA from NOAA through the Mission Requirements Document (MRD). NASA then allocated the NOAA performance requirements to the individual instruments within the GOES-R payload suite. During the Program Definition and Risk Reduction phase (PDRR), NASA worked with the prospective spacecraft and ground system providers to refine the spacecraft specification. Capitalizing on lessons learned from other major spacecraft programs, and employing the GSFC Goddard Open Learning Design[1] (GOLD) Rules, NOAA and NASA developed specifications, mission assurance requirements, and statements of work to fully define the mission requirements. Thus, the GOES-R set of requirements represents the best defined requirements set of any previous GOES mission, and an excellent baseline from which to proceed with development of the Nation's next generation geostationary weather satellite.

The GOES-R series spacecraft includes five key instruments: the Advanced Baseline Imager (ABI); the Space Environmental In-Situ Suite (SEISS); the Extreme Ultra Violet and X-ray Irradiance Sensor (EXIS); the Solar Ultra Violet Imager (SUVI); and, the Geostationary Lightning Mapper (GLM). A sixth instrument, the magnetometer, will be developed as part of the spacecraft contract. In 2001, NASA and NOAA issued preliminary design (or formulation) contracts as an initial step to mitigating risk associated with the GOES-R instrument development activities. Implementing a "phased-contract" approach provided for an initial study period where technology maturity and vulnerabilities were assessed and rigorous requirements evaluations were completed before contracting for the implementation and development phases. The first instrument formulation contract awarded was for the ABI. Considered the most complex instrument development activity, ABI will monitor and track severe weather and provide images of clouds to support forecasts. Awarding the ABI development effort early and employing the phased contract approach allowed the GOES-R program sufficient time to work through all of the issues that arise during the development of a state-of-the-art instrument and ensures that the performance of the ABI instrument meets our customer's requirements. Subsequently, study and implementation contracts were awarded for each of the remaining four GOES-R instruments. ABI has completed its critical design review (CDR) and the prototype model instrument is currently being integrated. The remaining four instruments have all completed their preliminary design reviews (PDR) and are working towards their CDR's.

Interfaces between instruments and spacecraft present the next greatest development challenge for the GOES-R program. NASA has engaged in a number of risk reduction activities to reduce the risk on the GOES-R program. These include developing and qualifying the instrument to spacecraft communications interface (e.g. SpaceWire communications protocol). Other risk reduction activities include Global Positioning System (GPS) at Geostationary (GEO) receiver development, Field-Programmable Gate Array (FPGA) life testing, Electrical, Electronic, and Electromechanical (EEE) parts radiation testing, loss-less compression chip development, solar-blind detector development, dual circular-polarization receiver testing, and thermal radiator (white paint) coatings qualification. All of these activities are directly applicable to the GOES-R mission and serve to reduce risk for flight hardware contractors.

Demonstrating responsible cost and schedule performance demands that NASA closely monitor contract performance, maintaining contract oversight to ensure the delivery of quality and timely products. All instrument and spacecraft contracts are managed as separate entities within the GOES-R Flight Project –

[1] http://askmagazine.nasa.gov/issues/22/22_enhancing_day.php

not as one large prime contract – thereby assuring that the Government has the authority to implement any actions necessary to ensure success. With dedicated managers, contracting officers and engineering oversight, each effort is afforded the attention required to stay on top of developments, issues, and risks. NASA performs in-depth contract reviews and has implemented the necessary insight and oversight into the contractors' efforts. NASA has fully implemented earned value management on all flight hardware contracts and reviews the data with the GOES-R Program Office on a monthly basis. With GSFC's 50-year history in managing spacecraft development efforts (with skills in engineering, procurement, mission assurance, and mission management), NASA is in a position to apply all necessary resources to the GOES-R Program to reduce risk and ensure success.

Space Segment Contract Award

By way of background, Lockheed Martin Space Systems Company (LMSSC) was awarded the GOES-R spacecraft contract on December 4, 2008. On December 15, 2008, Boeing Satellite Systems (BSS) filed a bid protest with the Government Accountability Office (GAO) against the GOES-R spacecraft contract award to LMSSC. As a result of the protest, the contract and any associated work were suspended. On February 17, 2009, NASA requested that the GAO dismiss the protest as a result of the Agency's decision to re-evaluate the proposals of Lockheed Martin and Boeing, and make a new selection decision. On February 19, 2009, the GAO dismissed the protest. After the protest was dismissed, the NASA Source Evaluation Board (SEB) reconvened to re-evaluate the proposals of Lockheed Martin and Boeing. A new contract award is planned for May 2009. Please note that the Administration is not at liberty to provide details concerning the GAO bid protest proceedings, since those are subject to the protective order issued by GAO. In addition, since a new contract award has not yet been made, the Administration is unable to disclose information concerning the re-evaluation, as it is source selection sensitive.

Once NASA has selected a spacecraft contractor and NOAA has selected a ground system contractor, NOAA will establish a new launch readiness date. In the meantime, NASA is taking all possible steps to minimize schedule risk. Instrument contracts are being held to their original delivery dates and not being allowed to slip.

The delayed award of the spacecraft contract may result in additional instrument accommodations risk. This risk is defined as the possibility of incompatible interfaces between the spacecraft and instruments. However, to mitigate this risk NASA's Flight Project Office continues to perform as the spacecraft integrator in the absence of a spacecraft contractor. Overcoming this challenge is not new to NASA, where frequently instrument development efforts are initiated very early in the systems acquisition process given their long-lead development requirements. NASA has established resource allocations on the GOES-R program for the instruments and spacecraft, holding sufficient margins against both. In addition, NASA has established and documented firm interface requirements for the instruments and spacecraft, which are on all contracts.

NASA Program Management Transparency

NASA continues to fulfill its commitment towards complete transparency in the execution of the Flight Project within the GOES-R Program. Starting early in the GOES-R program formulation, NASA and NOAA made the decision to co-locate the GOES-R Program Office and Ground Project at GSFC. Employing a centrally located GOES Program Office is a first for the long-term NOAA/NASA relationship. The co-located office enables daily interaction between the respective project elements and fosters closer working relationships. Approximately 100 NOAA employees and contractors supporting GOES-R reside and work at GSFC. Within the NASA Flight Project, the Deputy Project Manager

(DPM) is a NOAA employee and three of the Instrument Managers are NOAA employees. Within the NOAA Ground Project, the DPM is a NASA employee as is the Systems Manager. Within the NOAA Program Office, the Assistant System Program Director is a NASA employee and within the Program Systems Engineering Office, the lead Program Systems Engineer is a NASA employee, and the Deputy is a NOAA employee. From a personnel standpoint, the GOES-R Program is totally integrated.

The NASA Flight Project reports directly to the NOAA Program Office. So, all of the typical staff meetings, board meetings, etc. that occur on a routine basis within a Program Office are attended by the Flight Project and reported to the NOAA Program Office. Conversely, NOAA Program Office personnel attend all NASA flight hardware contractor reviews and internal technical meetings. All deliverable contractor data is stored electronically and the NOAA Program Office has access to all data. Finally, all earned value analysis for the Flight Project is performed by the NOAA Program Office.

External reporting is handled similarly. The GOES-R Management Control Plan (MCP) outlines the overall reporting requirements. Both GOES-R Projects engage in the standard reporting processes that are implemented for Projects at GSFC. Both Projects report status on a monthly basis to the Director of Flight Projects and then again to the GSFC Center Management Council (CMC) at Monthly Status Review (MSR) meetings. The GOES-R Program Office attends both of these reviews and is invited to present status as well. Additionally, NOAA/National Environmental Satellite, Data, and Information Service (NESDIS) personnel attend the MSR and sit at the table with the GSFC CMC in review of the GOES-R Projects. The same is true with the NOAA Program Management Council (PMC). The GOES-R Program presents monthly to the PMC, along with other NASA/NOAA Programs—GOES-N/P, POES, NPP, and NPOESS. Sitting on the PMC, along side of NOAA, are representatives of senior leadership from GSFC. These include the GSFC Deputy Center Director and the NASA Chief Engineer. NOAA senior leadership hears exactly the same thing as NASA management, sitting side-by-side at two different monthly reviews of the GOES-R Program.

In summary, NOAA has access to all contract documentation and attends all contract reviews. NOAA attends and participates in all Flight Project reporting to NASA management, and NASA participates in NOAA PMC meetings. NOAA performs all of the earned value analysis on the Flight Project contracts, so there is no misunderstanding of any cost or schedule performance issues. There is unprecedented transparency between NASA and NOAA on the GOES-R Program.

Conclusion

In closing, NASA remains committed to minimizing cost, schedule and performance risk on the GOES-R program and fulfilling our commitment to providing transparency in our project management activities. Building on the strength of our partnership with NOAA and its predecessor organizations since 1958, along with NASA's successful history of spacecraft and instrument development, we are looking forward to the successful completion and launch of the GOES-R series.

I would be pleased to respond to any questions you or the other Members of the Subcommittee may have.