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## Continuing Oversight of the Nation's Weather Satellite Programs: An Update on JPSS and GOES-R

*Witnesses:*

**Kathryn Sullivan**

Assistant Secretary of Commerce for Environmental Observation and Prediction and Deputy Administrator, National Oceanic and Atmospheric Administration

**Marcus Watkins**

Director, Joint Agency Satellite Division, National Aeronautics and Space Administration

**David Powner**

Director, Information Technology Management Issues, Government Accountability Office

*Investigations and Oversight Subcommittee Members Present:*

Paul Broun (R-GA), Chair

Paul Tonko (D-NY), Ranking Member

Jerry McNerney (D-CA)\*

*Energy and Environment Subcommittee Members Present:*

Andy Harris (R-MD), Chair

Brad Miller (D-NC), Ranking Member

Dana Rohrabacher (R-CA)

Zoe Lofgren (D-CA)

*Full Committee Members Present:*

Ralph Hall (R-TX), Chair

Steven Palazzo (R-MS)

*\*serves on both subcommittees*

On June 27, 2012, the House Committee on Science, Space, and Technology Subcommittees on Investigations and Oversight and Energy and Environment held a joint hearing to receive an update on the progress of the Joint Polar Satellite System (JPSS) and the Geostationary Operational Environmental Satellite-R Series (GOES-R). The National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA) jointly operate the two national weather satellite programs to provide the United States with accurate and reliable weather forecasting capabilities. The progress of the Suomi National Polar-orbiting Project (NPP), a preliminary test program for JPSS, was discussed to assess its capabilities to acquire a wide range of land, ocean, and atmospheric measurements, prepare for future weather forecasting operational requirements, and create a U.S. climate monitoring system. Suomi NPP is critical to the development of the next generation satellite system.

In his opening statement, Investigations and Oversight Subcommittee Chairman Paul Broun (R-GA) recounted the many past hearings held on JPSS and GOES systems and said the "level of oversight is indicative of how important weather satellites are to our society." He described the shortfalls of the original National Polar-orbiting Operational Environmental Satellite System (NPOESS) that was supposed to consist of six satellites carrying thirteen instruments, operate in three orbits, and cost \$6.5 billion, but became a program with only three satellites, operating in one orbit, at twice the cost. Chairman Broun said he was frustrated

that NOAA lacks a baseline for the cost and schedule of the satellite program. The Office of Management and Budget has established a \$12.9 billion cost cap for development and operation of JPSS through 2028 and a \$10.9 billion life cycle cost cap for GOES-R. Broun commented that the JPSS cost cap is \$1.7 billion lower than NOAA's cost estimates for the program and he is curious how NOAA plans to cover this shortfall without diminishing satellite capability. NOAA will only operate the JPSS afternoon orbit and Broun described the potential for a data gap if there is little coordination between NOAA, the Department of Defense's Defense Weather Satellite System's early morning orbit coverage, and the Europeans' midmorning orbit coverage. GOES-R is making significant progress but requires additional monitoring to track the use of reserves and uphold the schedule. Broun concluded by questioning the impacts of transferring the weather satellite programs from NOAA to NASA, as proposed by the Senate Appropriations Commerce, Justice, Science and Related Agencies subcommittee bill (S. 2323).

Investigations and Oversight Ranking Member Paul Tonko (D-NY) stated that the JPSS "cycles of disaster" should be brought "under control." He said the GOES-R and JPSS programs need to be assessed and receive support to get the programs effectively launched and operated. Despite the past failures, Tonko emphasized, "Satellites and instruments are too important to our nation to abandon these programs." He said he hoped to hear about NOAA's and NASA's plans to fill data gaps, the remaining risks of each satellite and strategies to address the risks, and a reaffirmed confidence in the management teams for the JPSS and GOES-R satellite programs.

Energy and Environment Subcommittee Chairman Andy Harris (R-MD) stated that he hopes to see improvement but with "every step forward, it seems we are taking two steps back." He noted that the launch of the Suomi NPP was five years late, data gaps remain, and the cost of the program has increased by \$1 billion. Harris commented that GOES-R is moving forward, however NOAA "is burning through its funding reserves." Harris concluded that the current procurement process for weather forecasting is "simply not working."

In his testimony Brad Miller (D-NC), Energy and Environment Subcommittee ranking member, emphasized the influence of satellite-based weather forecasts on daily functions such as determining where to fly airplanes, when to rotate crops rotation, how to plan military missions, when to run power plants, and how to prepare for dangerous storms. Miller stated that poor management and wasteful spending threatens forecast capabilities and could create economic and health risks. He called for evaluation of necessary funding levels and reserves required to keep costs low and the project on time. Miller concluded that keeping the projects on track are essential to keep Americans safe and the economy efficient and productive.

In her testimony, Deputy Administrator of NOAA Kathryn Sullivan told the committee that significant progress has been made with the JPSS and GOES-R satellites. The GOES-R is on target to meet the fiscal year (FY) 2016 launch date and the Suomi NPP was successfully launched in October 2011. Sullivan stated that NOAA's priority to maintain and improve the weather warning systems the U.S. depends upon requires strong management, stable baseline requirements, and reliable funding. She highlighted several success stories such as geostationary satellite monitoring of Tropical Storm Debbie and the use of the Suomi NPP Cross-Track Infrared Sounder (CrIS) instrument to track wildfires in Colorado and Wyoming. Sullivan informed the committee that independent review teams are analyzing life cycle costs for the satellite programs to have a full, detailed baseline cost and schedule available July 2013. She emphasized that the satellites "on track and headed for success" because of the development of strategies to leverage existing capabilities and the commitment of all involved parties.

Marcus Watkins, NASA Director of the Joint Agency Satellite Division, told the committee that JPSS and GOES-R are critical to climate monitoring, research activities, and weather forecasting systems. He stated that NASA and NOAA have been "strengthening their working relationship" over the last 40 years and since then have established joint program management councils to oversee JPSS. Watkins described NASA's role as an acquisition agent for NOAA. The agency manages all of the JPSS instrument, spacecraft, and ground system contracts. Following the first Systems Requirements Review (SRR) in May 2012, development of JPSS-1, the upgraded copy of Suomi NPP, has continued full force and the satellite is anticipated to launch in FY2017. Watkins said the Critical Design Review has been completed and the GOES-R Series Flight Project has tasked the United Launch Alliance to use the Atlas V series of launch vehicles to place GOES-R in orbit. He continued that all the flight instruments are in flight fabrication, integration, or test phase. Watkins concluded that NASA and NOAA are committed to ensuring that weather and environmental requirements for the nation are met on "the most efficient and predictable schedule without reducing system capabilities or further increasing risk."

Director David Powner of Information Technology Management Issues for the Government Accountability Office (GAO) testified on the progress and the remaining weaknesses of the JPSS and GOES-R programs. He stated that the NPP demonstration satellite has seen solid development of all five sensors, with five 60 percent complete and two 85 percent complete. Powner outlined three areas for further oversight of the programs including how NOAA plans to operate under a \$12.9 billion spending cap, increasing transparency of NOAA's use of reserve funds, and evaluating how the polar satellite constellation will be managed. He commented that cost increases for the sensors, spacecraft, and ground components of the GOES-R satellites have been managed through the use of 30 percent of NOAA's reserves and the GAO schedule risk analysis found only a 48 percent confidence level that the program would meet its current launch readiness date of October 2015. Powner concluded that it is essential for NOAA to identify mitigation options for the potential satellite data gaps in order to efficiently leverage alternative satellite data sources and ensure reliable forecasting for U.S. citizens and property, military operations, and commerce.

Full Committee Chairman Ralph Hall (R-TX) began the question and answer period by asking if the Senate proposal to transfer weather satellite operations from NOAA to NASA would result in cost savings, streamline management, improve efficiency, or increase the overall likelihood of the program's success. Both Watkins and Sullivan replied that the agencies are in ongoing discussions with the administration to assess the proposal. Watkins added that NASA wants to assure that the agencies can maintain overall schedules and launch critical space assets as soon as possible and Sullivan commented that NOAA wants to maximize the continuity of satellite data.

Ranking Member Tonko stated "the odds are high" that there will be a data gap between the end of the productive life of Suomi NPP and the time when JPSS-1 is launched. He asked Sullivan if NOAA has a plan to cope with the data gap and if anyone has been assigned to evaluate the independent data sources. Sullivan responded that NOAA is renewing written and confirmed commitments with international partners, evaluating the technical characteristics of outside data streams, such as the Department of Defense Microwave Image Sounder, and making the necessary technical modifications to accommodate them. She said Mary Kicza, Administrator for Satellite and Information Services at NOAA, has oversight of these management projects. Powner added that it is critical for NOAA and NASA to remain on schedule to prevent the data gap; however he is confident that the agencies are in a "better position" than in the past because of the strong program management.

Chairman Andy Harris (R-MD) of the Energy and Environment subcommittee mentioned a blog publication by University of Washington Professor Cliff Mass on applying the NASA SpaceX privatization principles to weather satellites. Harris asked what NOAA's philosophy is on moving toward an alternative private model. Sullivan told Harris that "innovative ideas deserve careful exploration" and that in some cases NOAA uses private proposals and data as substitute information. She concluded that NOAA has not received any proposals similar to the SpaceX model. Harris then asked if NOAA could incorporate independent experts into more Observing System Simulation Experiments (OSSEs) to evaluate potential losses and gap mitigation strategies. Sullivan said NOAA would like to but currently does not have the "manpower or high performance computing systems" necessary to conduct OSSEs. Representative Harris questioned how NOAA plans to cover the entire polar orbiting constellation and mitigate the potential data gap. Sullivan informed him that that NOAA's National Earth Observations Task Force is working to collaborate with other federal agencies and the defense department to ensure a reliable data stream. Harris asked how NOAA prioritizes satellite climate sensors, ground based reception centers, and the Navy data processing centers when determining where to cut for the funding cap. Sullivan replied that NOAA has decreased the coverage of the ground reception network. Although a decrease in ground stations increases the time delay for JPSS data transfers from 30 minutes to 80 minutes, the JPSS system remains an improvement from the current performance of data transfer at 120 minutes.

Miller asked the panel if JPSS and GOES-R are on track and if there are potential areas for mistakes. Powner responded that there could be challenges with operating under the \$12.9 billion funding cap. Sullivan commented she had "strong confidence" that NOAA could operate under the \$12.9 billion cap by capitalizing on the Suomi NPP experience and modifying the ground systems. Because NASA and NOAA developed the satellite instrumentation early on in the process, Watkins concluded that the instruments should be completed on time.

Representative Dana Rohrabacher (R-CA) asked for a total value of the monetary loss from the NPOESS program. Watkins responded that \$4.3 billion was spent on the disbanded project, however many instruments and the ground system for Suomi NPP mission were developed. Rohrabacher mentioned the Senate proposal to transfer authority for procuring satellite equipment to

NASA and commented that it would make more sense to have NASA focus on space exploration and NOAA maintain weather satellite authority.

Representative Zoe Lofgren (D-CA) asked the panel how a continuing resolution made during the appropriation process would affect the weather satellite programs. Sullivan said a continuing resolution would compromise the plan for FY 2013 appropriations for purchase of a launch vehicle for the GOES-R launch and the program budget is supposed to increase by \$803 million in FY 2016. Both Watkins and Sullivan commented that a lack of funding would severely compromise the mission schedule for GOES-R, but it would have less of an impact on JPSS. Lofgren suggested that NOAA and NASA conduct rigorous economic analyses for the cost impacts associated with severe weather to demonstrate the importance of satellite weather forecasting.

Representative Steven Palazzo (R-MS) stated that NASA has its “hands full” with space exploration projects and asked if transferring authority for space satellites from NOAA to NASA would result in additional cost overruns. Watkins said NASA is in the process of evaluating the financial effects the switch would have. Because NASA currently serves only as an acquisition agent, the agency does not contribute any of its allocated funding to the satellite programs.

Mentioning his background as a mathematician, Representative Jerry McNerney (D-CA) asked the panel if mathematical modeling could be used as a substitute if a satellite data gap were to occur. Sullivan responded that NOAA is exploring the potential for models to lessen the impact of impaired forecasting capabilities. McNerney asked Powner if meeting the 2015 GOES-R satellite launch date is the biggest challenge for the program and if he had recommendations for NASA and NOAA to remain on schedule. In order to increase the level of confidence for the 2015 launch date, Powner suggested NOAA and NASA need to conduct a more complete assessment of the satellite schedule that includes subcontractor activities. Watkins commented that the largest risk to meeting the launch date is whether or not the program receives reliable funding. McNerney concluded by questioning the performance of the Suomi NPP test satellite. Watkins and Sullivan affirmed that the satellite instrumentation is operating well, the calibration period is on schedule, and the ground reception system is functioning as planned.

Witness testimonies, opening statements of the majority party, and a webcast of the hearing can be found on the House Science Committee’s web site.

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