



NOAA'S FY2016 BUDGET REQUEST FOR SATELLITES

Introduction

The National Oceanic and Atmospheric Administration (NOAA) manages the nation's civilian weather satellite and other operational environmental satellite programs.

NOAA is part of the Department of Commerce and has a broad set of missions that include marine fisheries management, ocean and atmospheric research, and operation of the National Weather Service as well as its satellite programs.

NOAA's satellite programs are part of NOAA's National Environmental Satellite, Data and Information Service (NESDIS). The NESDIS budget is separated into two accounts: Operations, Research and Facilities (ORF) and Procurement, Acquisition and Construction (PAC). The PAC account contains funding for acquisition of new satellite systems and is the only portion of the NESDIS budget tracked in this fact sheet.

NOAA's complete FY2016 budget request is available in [NOAA's FY2016 budget "blue book."](#) The portion of the NOAA/NESDIS budget request covered in this fact sheet is referred to in the blue book as NESDIS Systems Acquisition.

Congress appropriates funding to NOAA as part of the Commerce-Justice-Science (CJS) appropriations bill. The House Appropriations Committee approved its version of the FY2016 CJS bill and accompanying [report \(H. Rept. 114-130\)](#) on May 20, 2015 and the House passed the bill, H.R. 2578, on June 3, 2015. The Senate Appropriations Committee reported its version of the bill on June 16 (S. Rept. 114-66).

None of the 12 regular FY2016 appropriations bill cleared Congress before FY2016 began on October 1, 2016. The government was funded through a series of Continuing Resolutions until December 18 when the House and Senate passed, and the President signed, the FY2016 Consolidated Appropriations Act (H.R. 2029, P.L. 114-113). The final appropriations bill represents a compromise between the House and Senate, although the Senate never acted on the bill that was reported from the Senate Appropriations Committee.

NOAA's Satellite Programs

Responsibilities for government weather, land imaging, and earth science satellites are split among several agencies. NOAA manages the nation's civilian weather satellites and, historically, other operational environmental satellite programs. NASA builds and launches earth science satellites for research and technology development purposes. The U.S. Geological Survey operates the government's Landsat land remote sensing satellites. The Department of Defense (DOD) has its own weather satellite program as well as classified satellites for intelligence gathering.

This fact sheet covers only NOAA's satellite programs. The Obama Administration is proposing as part of its FY2016 budget request a shift in responsibilities between NASA and NOAA whereby in the future NOAA will manage only weather satellites, including space weather, but not other civil earth observing satellites as it has in the past. The issue is discussed in our companion fact sheet on NASA's FY2016 budget request and an [article](#) published on February 4.

Weather Satellites

NOAA operates two complementary weather satellite systems, one in polar orbit and one in geostationary orbit.

Polar Orbit

Satellites in polar orbit circle Earth's poles, allowing them to view the entire planet. NOAA's current polar orbit satellites are called POES – Polar Orbiting Environmental Satellites. Once in orbit, they are given a designation of "NOAA" followed by a number. NOAA-19, the last of the series, was launched in 2009. NOAA is now developing a new system called Joint Polar Satellite System (JPSS). The first two satellites, JPSS-1 and JPSS-2, are expected to be launched in 2017 and 2021. NOAA requested funds in FY2016 to begin a "Polar Follow On" program to build the next two JPSS-3 and JPSS-4. NOAA also is part of an international/interagency team building a constellation of small satellites, COSMIC-2, to enhance the accuracy of forecasts using data from the polar orbiting satellites.

Because of the many years between the launch of NOAA-19 and planned launch of JPSS-1, NOAA is using a satellite developed by NASA, Suomi-NPP (S-NPP), as an operational weather satellite even though it was not designed for operational use. S-NPP was launched in 2011. NOAA officials and other policy makers have expressed concern in the past that NOAA-19 and S-NPP might cease functioning before JPSS-1 is launched and a "gap" in weather satellite coverage might occur. The new head of NESDIS, Steve Volz, downplayed the chances of a gap at a [February 12, 2015 congressional hearing](#), however, but a Government Accountability Office (GAO) witness at the hearing was skeptical of those claims. One of GAO's concerns is that the JPSS-1 launch date may slip because of late delivery of instruments, especially the Advanced Technology Microwave Sounder (ATMS).

- **JPSS.** NOAA was criticized for the high cost of the JPSS program and reduced the cost from \$12.9 billion to \$11.3 billion by narrowing the definition of what is included in that estimate. As currently formulated, the JPSS program covers the costs of building and operating only the first two JPSS satellites, JPSS-1 and JPSS-2, plus the money NOAA spent on a prior NOAA-DOD-NASA program that was cancelled after years of schedule delays and cost overruns (the National Polar-orbiting Operational Environmental Satellite System – NPOESS).

For FY2016, NOAA requested \$808.966 million for JPSS.

Congressional Action: The House approved full funding, but the House Appropriations committee expressed concern about “the challenges that continue to plague” JPSS (and GOES-R) in its report accompanying the bill. It especially noted its concern about “continuous delays” in producing the Advanced Technology Microwave Sounder. The Senate Appropriations Committee approved full funding and stressed the need to keep the program on budget and schedule. The final bill also provides full funding.

- **Polar Follow On (PFO).** The FY2016 budget included the first request for building JPSS-3 and JPSS-4, which are not included in the definition of the JPSS program. They have a separate name, Polar Follow On (PFO), and separate budget line.

The FY2016 budget request for PFO was variously described as \$370 million or \$380 million. The \$10 million difference is for an “Earth Observing Nanosatellite-Microwave” (EON-MW) miniature microwave sounder. In the section of NOAA’s budget book describing the NESDIS request, PFO and EON-MW are shown in separate tables, but the text description of PFO includes EON-MW. The summary table at the end of the book has only one entry, PFO, with a request of \$380 million.

Congressional Action: The House Appropriations Committee provided zero funding for this program, without explanation. PFO simply is not mentioned in the text or tables in the bill or report. The Director of the Office of Management and Budget (OMB), Shaun Donovan, wrote a [letter](#) to House Appropriations Committee Chairman Hal Rogers (R-KY) and Ranking Member Nita Lowey (D-NY) the day before the markup calling the decision “shortsighted,” likely to cause gaps in weather satellite coverage, and to cost taxpayers more in the long run. Just prior to the bill being considered on the floor, the White House issued a [Statement of Administration Policy](#) (SAP) with the same message as the Donovan letter. The SAP contained a veto threat because the White House disagrees on this and many other issues.

During floor debate on June 2, 2015, Rep. Suzanne Bonamici (D-OR) introduced an amendment to restore the \$380 million, but withdrew it after the chairman of the CJS subcommittee, John Culberson (R-TX), raised a point of order because there were no corresponding cuts (“offsets”) to compensate for the addition. A [SpacePolicyOnline.com article](#) summarizes House debate on the CJS bill on June 2 and 3.

The Senate Appropriations Committee provided \$135 million and directed NOAA to obtain an Independent Cost Estimate for the program. The final bill provides all \$370 million for PFO, but not the \$10 million for EON-MW.

- ***COSMIC-2 GPS Radio Occultation.*** The Constellation Observing System for Meteorology, Ionosphere and Climate (COSMIC)-2 program is a constellation of 12 very small (“micro”) satellites built by NOAA in cooperation with Taiwan and the U.S. Air Force. It is a follow on to COSMIC (also known as Formosat-3), a set of six microsattellites launched in 2006.

The satellites use signals from the Global Positioning Satellite (GPS) system for radio occultation (dubbed GPS-RO or GNSS-RO¹) to make measurements of temperature and water vapor throughout the lower parts of the atmosphere. When combined with measurements from polar-orbiting weather satellites, better weather forecasts are enabled.

Two sets of six microsattellites are planned. Both will be launched into low Earth orbit. One will be in equatorial orbit and the other in polar orbit.

The FY2016 request included funds to receive and process signals from the first set (scheduled for launch in FY2016), and to procure the second set (for launch in FY2019), so there are two line items for COSMIC-2 this year in the main part of the NESDIS budget explanation, although they are combined in the summary table at the end. The request for ground operations for the first set was \$10 million, and for sensors for the second set was \$9.9 million.

Congressional Action: The House approved the request. The report on the bill directs NOAA to submit within 30 days of enactment of the bill a “comprehensive plan” for the next segment of COSMIC-2. The Senate Appropriations Committee provided the \$10.1 million for processing signals from the first set, but zero for procuring a second set, stating that the Air Force has not committed to providing a launch. It encourages NOAA to explore options for obtaining such data, including from commercial data purchases. The final bill provides \$10.1 million.

Geostationary Orbit

The other system is in geostationary orbit 35,800 kilometers above the equator where satellites maintain a fixed position relative to a point on Earth. Such weather satellites are especially useful for monitoring tropical regions where hurricanes form. NOAA keeps one Geostationary Operational Environmental Satellite (GOES) over the eastern region of the United States and adjacent waters and another over the western region. Whatever satellites are in those positions are designated “GOES-East” and “GOES-West.” NOAA typically also keeps a spare satellite in between those two positions that can be moved quickly to replace a malfunctioning satellite if

¹ GPS is the U.S. satellite system for positioning, navigation and timing (PNT) data. Russia and China have their own systems (GLONASS and Beidou) and Europe is building one (Galileo). Collectively they are referred to as Global Navigation Satellite Systems (GNSS). The COSMIC-2 satellites can use any of the signals.

necessary (as happened in [2012](#) and [2013](#)). The GOES-13 satellite is now GOES-East and GOES-15 is GOES-West, with GOES-14 as the spare.

NOAA is procuring four new GOES satellites – a block buy called the GOES-R series. At this point they have letter designations (GOES-R, -S, -T and -U), which will change to numbers once they are in orbit. GOES-R was scheduled for launch in March 2016, but in December 2015 NOAA announced a six-month slip to October 2016. The reasons were not specified.

NOAA has been planning to decommission GOES-13 in April 2015 and use GOES-14 as GOES-East. Its current plans are unclear. If they go ahead and decommission GOES-13, there will be no spare satellite until GOES-R is launched and checked out (which takes about 6 months). At the [February 12, 2015 congressional hearing](#), concern was expressed by committee members and GAO about a possible gap in geostationary weather satellite coverage during those 17 months when there is no in-orbit spare. GAO urged that every effort be made to ensure that GOES-R's launch date does not slip, but it slipped nonetheless.

NOAA's FY2016 request for GOES-R was \$872 million.

Congressional Action: The House approved the requested amount and in the accompanying report, as noted under JPSS, expressed concern about continuing challenges in executing the program. The Senate Appropriations Committee also approved full funding, with cautionary statements about staying on-budget and on-schedule. The final bill approves full funding.

Other Operational Environmental Satellites

NOAA also is responsible for four other satellite projects in partnership with NASA, the Air Force or other countries. As noted previously, [the Obama Administration proposed](#) that NASA take over responsibility for all civil earth observing satellites other than those for weather (JPSS and GOES) or space weather (DSCOVR and whatever the follow on program will be).

Space Weather

- **DSCOVR.** The Deep Space Climate Observatory (DSCOVR) monitors “space weather” caused by particles ejected by the Sun that impact Earth's atmosphere and can result in satellite failures or power outages on Earth, for example. It was successfully [launched](#) on February 11, 2015.

NOAA requested a small amount of funds, \$3.2 million, for DSCOVR in its FY2016 request for operations, data processing and related activities.

Congressional Action: The House provided the requested amount, as did the Senate Appropriations Committee. The final bill also provides full funding.

- **Space Weather Follow-On.** NOAA requested \$2.5 million in FY2016 to begin analyzing alternatives for the next space weather satellite.

Congressional Action: The House approved the requested amount. The Senate Appropriations Committee provided no funding, instead directing NOAA to provide a report on its operational needs and the potential impact of a gap in space weather data after 2019. The final bill splits the difference and approves \$1.2 million.

Other Programs

- **Jason-3.** This is the third in a series of Jason satellites that provide ocean altimetry data following on the success of the Topex/Poseidon satellite. That satellite and the first two Jasons were experimental and funded by NASA and its French counterpart, CNES. The data collection is now transitioning into an operational mode so Jason-3 is funded by NOAA and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), with NASA and CNES as partners in the program.

Last year, the Senate Appropriations Committee recommended that Jason-3 be transferred to NASA in its report on the FY2015 Commerce-Justice-Science appropriations bill. Although that recommendation was not adopted in FY2015, the Obama Administration is proposing in FY2016 that future ocean altimetry satellites be NASA's responsibility.

NOAA therefore requested funds in FY2016 only to complete construction and operation of Jason-3. The launch was scheduled for the spring of 2015, but slipped to August 2015 because of a contaminated thruster on the spacecraft, which is built by Thales Alenia Space. It then was delayed when SpaceX's Falcon 9 rocket failed on June 28, 2015 while launching a cargo mission for NASA. Jason-3 will be launched by a Falcon 9 rocket, which had a successful launch on December 21. That paves the way for SpaceX to launch Jason-3 on January 17, 2016.

The FY2016 request was \$7.5 million (the out-year requests show a similar amount planned each year through FY2019, and then zero beginning in FY2020).

Congressional Action: The House provided the requested amount, as did the Senate Appropriations Committee. The final bill also provides the requested amount.

- **SIDAR.** The Solar Irradiance, Data and Rescue (SIDAR) program was first requested in FY2015 to replace the Polar Free Flyer (PFF) in NOAA FY2014 budget request, which was zeroed by Congress. The goal is to find a way to launch three instruments – Total Solar Irradiance Sensor (TSIS), Advanced Data Collection System (A-DCS), and Search and Rescue Satellite-Aided Tracking (SARSAT) – that were intended to be launched on the since-cancelled NPOESS satellites (explained earlier). The JPSS spacecraft that replaced NPOESS are too small to accommodate these three instruments and NOAA is trying to find an alternative way to get them into orbit.

Congress provided only half the \$15 million NOAA requested for SIDAR in FY2015, and this year is another change. The Obama Administration proposed transferring TSIS

to NASA and is included in NASA's FY2016 budget request (see our companion [fact sheet on NASA's FY2016 budget request](#)). Congress did not disapprove the transfer.

NOAA requested only \$500,000 for SIDAR in FY2016 to “plan the accommodation” of A-DCS and SARSAT for launch in 2019. No out-year funding for SIDAR was included in the FY2016 budget plan.

Congressional Action: The House provided zero funds for SIDAR and did not comment on it. The Senate Appropriations Committee provided the requested amount. The final bill provides the requested \$500,000.

- **Commercial Weather Data Pilot.** The final bill includes \$3 million for a commercial weather data pilot program. Language in the accompanying explanatory report directs NOAA to seek to enter into at least one pilot contract, through a competitive process, to assess the potential viability of commercial weather data in its weather modeling and forecasting. The \$3 million is to purchase, evaluate and calibrate such data.

The PAC account in NESDIS also funds satellite ground services; systems architecture and advanced planning; and projects, planning and analysis.

**NOAA's FY2016 Budget Request for Satellite System Acquisition
(in \$ thousands)**

Program	FY2014 enacted	FY2015 enacted	FY2016 Request	FY2016 House-passed	FY2016 Senate approved	Final FY2016 P.L. 114-113
GOES-R	941,899	980,838	871,791	871,791	871,791	871,791
Jason-3	18,500	23,175	7,458	7,458	7,458	7,458
JPSS	820,855	916,267	808,966	808,966	808,966	808,966
Polar Follow On (incl EON-MW)	N/A	N/A	380,000	0	135,000	370,000
SIDAR	see note 3	7,300	500	0	500	500
DSCOVR	23,675	21,100	3,200	3,200	3,200	3,200
Space Wx FO	N/A	N/A	2,500	2,500	0	1,200
COSMIC-2	2,000	6,800	20,000	20,000	10,100	10,100
<i>ground</i>	2,000	6,800	10,100	10,100	10,100	Not specified
<i>sensors</i>	N/A	N/A	9,900	9,900	0	Not specified
Satellite Grnd Services	49,734	50,000	58,525	58,525	50,000	54,000
Sys Architecture & Adv Planning	4,587	3,000	4,929	3,000	3,929	3,929
Projects, Planning & Analysis	33,488	25,200	30,488	25,200	25,228	25,200
Commercial Wx Pilot	--	--	--	--	--	3,000
TOTAL	1,894,738	2,033,680	2,188,357	1,800,640	*1,916,172	2,159,344

Source: Budget request data from NOAA's FY2016 budget blue book. The descriptive section of the budget book shows funding for the Polar Follow-On (\$370 million) and for the EON-MW (\$10 million) in separate tables, but they are combined together in other sections of the report. The appropriations figures are from the reports accompanying the House and Senate appropriations Commerce-Justice-Science (CJS) bills and final omnibus bill.

*The figure in the Senate report is \$1,918.4 million because it includes \$2.228 million for a "Satellite CDA facility" that is not tracked in this report.

Note 1: This fact sheet does not track spending for the other NESDIS budget account, Operations, Research and Facilities (ORF).

Note 2: Numbers in italics are subsets. N/A = Not Applicable.

Note 3: In FY2014, this was called Polar Free Flyer (PFF). NOAA requested \$62 million; Congress zeroed it. The FY2015 request was \$15 million and Congress provided about half. In FY2016, the Obama Administration proposed shifting one of the three instruments included in this account, TSIS, to NASA. See text for additional information.