



# Report in Brief

March 24, 2020

## Background

National Oceanic and Atmospheric Administration's (NOAA's) Joint Polar Satellite System (JPSS) satellites orbit approximately 520 miles above Earth. Environmental data collected by the satellites are critical inputs for numerical weather models' 3- to 7-day forecasts, which allow for early warnings and enable emergency managers to make timely decisions to protect lives and property.

The JPSS program (Program) is a collaboration between NOAA and the National Aeronautics and Space Administration (NASA). NOAA provides funding and retains overall responsibility and authority for the development and operations for the entire Program. It also manages ground system operations and infrastructure. NASA manages the acquisition and development of the satellites (spacecraft and instruments), flight simulators, and launch services.

## Why We Did This Review

Our objective was to assess the cost, schedule, and technical performance of the Program's spacecraft acquisition and development efforts. Specifically, we sought to (1) determine the extent to which cost and schedule changed from the original Program baselines, and (2) identify changes and challenges to the Program's technical baseline.

## NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

### The Joint Polar Satellite System: Program Can Increase the Likelihood of Mission Success by Further Applying NASA Processes to Its Spacecraft Development Efforts

OIG-20-021-A

#### WHAT WE FOUND

We found that from March 2015 to November 2019, the cost of the JPSS-2 spacecraft firm-fixed-price contract increased by \$28.6 million—or 12 percent—to \$273.4 million. This price increase was primarily due to government-directed engineering changes, including one that changed the payload interface electronics (PIE) field programmable gate arrays (FPGAs) to a reprogrammable architecture. This change in FPGAs was done to mitigate schedule risk that may be caused by the discovery of design or interface issues during integration and test, which would have required the original FPGAs to be replaced.

Completing development of the PIE continues to be a major challenge towards finalization of the JPSS-2 spacecraft. In addition to issues with interface requirements and technical readiness of the PIE, we found that

- the Program can reduce risk by implementing a more comprehensive methodology for FPGA development;
- the Program can further reduce risk to FPGAs by applying NASA guidance for software development; and
- metrics related to PIE development have improved, but the Program needs additional measures to understand and track FPGA development progress.

At the completion of our fieldwork, we discussed these issues with Program personnel in order to provide them with the greatest amount of time prior to completion to take appropriate action. Addressing issues related to PIE FPGAs will reduce cost, schedule, and technical risks, as well as increase the likelihood of mission success.

#### WHAT WE RECOMMEND

We recommend that the NOAA Assistant Administrator for Satellite and Information Services do the following:

1. Direct the Program to review Goddard Space Flight Center methodology for FPGA development and determine necessary actions to reduce the risk of its FPGA developments.
2. Direct the Program to determine the extent to which it can apply NASA software requirements and guidance to FPGA developments in order to reduce mission risk.
3. Direct the Program to determine the extent to which it can implement additional FPGA-level metrics that allow Program management to track the design according to NASA guidance.