

# GAO Highlights

Highlights of [GAO-18-370](#), a report to congressional committees

## Why GAO Did This Study

NSF uses cooperative agreements and contracts to fund construction of science and engineering research infrastructure, such as telescopes. In 2008, NSF established a policy to manage cost overruns and strengthen oversight of these large facilities projects, which typically have construction costs greater than \$70 million. Among other things, the policy generally requires a project's scope to be reduced before its NSF-authorized cost may be increased.

Senate Report 114-239 and House Report 114-605 included provisions for GAO to review projects funded within NSF's Major Research Equipment and Facilities Construction account used to fund construction of large facilities projects. GAO (1) examined the extent to which NSF's procedures for estimating construction costs and schedules of large facilities met best practices and (2) described the construction cost and schedule performance of NSF's large facilities projects since implementation of its policy to manage cost overruns. GAO compared NSF's procedures documented in its policies with best practices in GAO's cost and schedule guides, analyzed documents for the seven projects covered by NSF's policy to manage cost overruns, and interviewed NSF officials.

## What GAO Recommends

GAO recommends that NSF revise its policies for estimating and reviewing the costs and schedules of large facilities projects to better incorporate best practices in GAO's cost and schedule guides. NSF agreed with GAO's recommendations.

View [GAO-18-370](#). For more information, contact John Neumann at (202) 512-3841 or [neumannj@gao.gov](mailto:neumannj@gao.gov).

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## NATIONAL SCIENCE FOUNDATION

### Revised Policies on Developing Costs and Schedules Could Improve Estimates for Large Facilities

## What GAO Found

The National Science Foundation's (NSF) procedures for overseeing large facilities construction projects met many best practices for cost estimating but not those for developing project schedules. Specifically, NSF's procedures fully or substantially met 7 of 12 best practices in GAO's cost estimating guide and partially or minimally met others (such as conducting a sensitivity analysis to understand which variables most affect the cost estimate). In addition, they minimally met or did not meet 6 of 10 best practices in GAO's schedule development guide (such as establishing the durations of all activities). Further, while NSF reviews recipients' construction cost and schedule estimates for large facilities, the agency's policies did not incorporate procedures on how NSF officials are to ensure that those estimates meet best practices. An agency's procedures support the creation of reliable cost and schedule estimates when they fully or substantially meet the best practices in GAO's cost and schedule guides. NSF officials said that the agency's approach was to reference rather than repeat best practices in GAO's cost guide, except where agency-specific clarifications were needed. Nevertheless, without policies on how to apply all relevant best practices specifically to NSF's large facilities projects, recipients may develop cost or schedule estimates that are not reliable.

Of the seven projects NSF had funded that were covered by its policy to manage cost overruns, five had experienced cost or schedule increases since starting construction. In particular, two projects—the National Ecological Observatory Network and Daniel K. Inouye Solar Telescope—had both cost and schedule increases that were partly due to permitting challenges that could not be estimated at the time of the projects' proposals, according to NSF officials. Both of these projects also reduced their scopes. NSF required the reductions to the observatory network's scope under the agency's policy for managing cost overruns, whereas the reduction to the telescope project was a separate action. Three other projects had only schedule increases, with no increase in costs, and the remaining two projects had experienced neither cost nor schedule increases as of December 2017.

**Cost and Schedule Performance of Large Facilities Projects Covered by NSF's Policy for Managing Cost Overruns, as of December 2017**

Project name	Percentage complete	Cost change	Schedule change	Scope reductions
Alaska Region Research Vessel	100	▼	▲	-
Ocean Observatories Initiative	100	▼	▲	-
Advanced Laser Interferometer Gravitational Wave Observatory	99	-	▲	-
National Ecological Observatory Network	94	▲	▲	✓
Daniel K. Inouye Solar Telescope	81	▲	▲	✓
Large Synoptic Survey Telescope	50	-	-	-
Regional Class Research Vessels	4	-	-	-

Legend: - = no cost or schedule increase or scope reductions since starting construction; ▼ = cost decreased; ▲ = cost or schedule increased; ✓ = scope reduced.

Source: GAO analysis of National Science Foundation (NSF) documents. | GAO-18-370