

GAO Highlights

Highlights of [GAO-19-227](#), a report to congressional committees

Why GAO Did This Study

NSF awards cooperative agreements and contracts to external funding recipients to fund construction of science and engineering research infrastructure, such as telescopes. These large facilities projects typically have construction costs of at least \$70 million and may take many years to design and construct. Having expertise in project management can help keep complex projects on schedule and on budget, and identifying lessons learned from projects can help improve project oversight and performance.

Senate Report 114-239 and House Report 114-605 included provisions for GAO to review NSF's large facilities projects. This report examines, among other things, (1) steps NSF has taken to ensure the project management expertise of NSF staff and award recipients, (2) the extent to which NSF identifies and shares lessons learned on large facilities projects, and (3) the cost and schedule performance of NSF's ongoing large facilities projects. GAO analyzed NSF policies and documents for the seven projects in design or construction, interviewed agency officials, and compared NSF's processes to leading practices identified in prior GAO work.

What GAO Recommends

GAO is making four recommendations to NSF including that NSF assess any gaps in its oversight staff's project management expertise, establish criteria for recipients' project management expertise, and ensure that recipients provide any lessons learned on projects to NSF. NSF generally agreed with GAO's recommendations.

View [GAO-19-227](#). For more information, contact John Neumann at (202) 512-6888 or neumannj@gao.gov.

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NATIONAL SCIENCE FOUNDATION

Cost and Schedule Performance of Large Facilities Construction Projects and Opportunities to Improve Project Management

What GAO Found

The National Science Foundation (NSF) took some steps to help ensure that its own oversight staff for large facilities projects and the agency's award recipients—such as universities or companies that design, construct, and operate the projects on a day-to-day basis—have project management expertise, but it had not taken certain additional steps. For example, as called for by leading practices, in 2018 NSF identified competencies needed by its oversight staff to ensure their project management expertise. In contrast, the agency had not yet assessed potential gaps in how well its staff met the competencies or established a time frame for doing so. Having such an assessment would help NSF target workforce strategies to fill any gaps identified. To assess the expertise of recipients, NSF relies on the judgment of external panels of experts it periodically convenes to review large facilities projects during design and construction. However, NSF had not established criteria for project management expertise needed by recipients, potentially increasing the risk of awarding funds to recipients that may not be well-qualified to manage large construction projects.

In 2017 NSF formalized its process to identify and share lessons learned on large facilities projects. This process was consistent with key practices from GAO's prior work on lessons learned. However, the agency had not established a requirement for all recipients to provide potential lessons learned. Ensuring, through a requirement or other means, that all recipients provide lessons learned could help NSF identify lessons that would benefit other projects.

NSF completed construction of the Advanced Laser Interferometer Gravitational Wave Observatory in 2018, continued construction on four other large facilities projects, and advanced the design of two; these projects had varying cost and schedule performance. Since GAO's June 2018 report, NSF delayed completion of the National Ecological Observatory Network by 3 months, for a total delay of 2.6 years; other projects under construction had no cost or schedule increases.

Cost and Schedule Performance of NSF Large Facilities Projects Recently Completed or Under Construction, as of September 2018

Project name	Percentage complete	Scheduled completion date	Cumulative performance since starting construction		
			Cost	Schedule	Scope reductions ^a
Advanced Laser Interferometer Gravitational Wave Observatory	100	2018	-	▲	-
National Ecological Observatory Network ^b	98	2019	▲	▲	✓
Daniel K. Inouye Solar Telescope	88	2020	▲	▲	✓
Large Synoptic Survey Telescope	60	2022	-	-	-
Regional Class Research Vessels	7	2024	-	-	-

Legend: - = no cost or schedule increase or scope reductions; ▲ = cost or schedule increased; ✓ = scope reduced.

Source: GAO analysis of National Science Foundation (NSF) documents and information from NSF officials. | GAO-19-227

^aScope reductions are in response to NSF's policy on cost overruns or as part of a cost increase.

^bThe percentage complete and schedule for the National Ecological Observatory Network are as of November 2018, when NSF extended the project's schedule.