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NSF Prepares for Review of Two Giant Telescopes

 by Jeffrey Mervis on 20 September 2011, 2:10 PM | [0 Comments](#)
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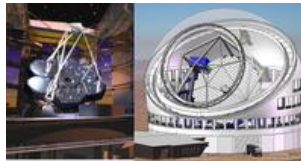
The National Science Foundation (NSF) is gearing up for a long-awaited competition between two California-based consortia seeking federal support to build the next giant ground-based telescope. But a perception that the playing field isn't level may lead one of the bidders to drop out.

Prodded by an influential report last year by the astronomy community and under pressure from Congress, NSF officials met late last month in Pasadena with both a team based at the California Institute of Technology that is designing the \$1-billion [Thirty Meter Telescope](#) (TMT) and a Carnegie Institution of Science-led squad working on the \$700-million [Giant Magellan Telescope](#) (GMT). Each group was asked to indicate whether it wished to participate in an NSF review of the project's scope and its plans for NSF support—the first step in eventually obtaining funding. Depending on how the two teams respond, NSF could issue a solicitation by the end of the year with an eye toward making a preliminary decision on the merits of each proposal by next summer. The review itself is seen as a vote of confidence in the idea of the next big instrument, and NSF's endorsement should be a boon to the winning team in securing additional funding from other partners, both public and private.

"We are ready to compete under whatever criteria NSF lays out," says Richard Ellis, an astronomer at Caltech and a spokesperson for the TMT project. TMT hopes that NSF will provide \$200 million to supplement \$300 million it has already raised, including \$200 million from the Gordon and Betty Moore Foundation. Given NSF's bleak short-term financial picture, however, Ellis said one option might be to ask NSF to support TMT's operations after other partners have chipped in enough money to build the telescope atop Mauna Kea in Hawaii.

There is less certainty, however, among planners of the GMT, to be built in the high desert of northern Chile. The leadership "is still considering its options," says Patrick McCarthy, the project's director and an astronomer at the Carnegie Observatories. "We are considering a range of financial models to see what works best for us in light of the long timeline associated with NSF funding." McCarthy is referring to the fact that, even if NSF makes up its mind next summer, it may be a decade before the money begins to flow because of NSF's constrained budget for new facilities.

Each [instrument](#) plans to use a cluster of segmented mirrors to greatly exceed the power of current telescopes. The GMT combines seven large mirrors to form a primary mirror 24.5 meters in diameter. The TMT achieves its namesake capacity by combining 492 smaller mirrors.

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A Senate spending panel has urged NSF to begin a face-off between two proposed telescopes: the Giant Magellan Telescope (*left*) and the Thirty Meter Telescope (*right*).

Credit: Images Courtesy GMT (*left*) and TMT (*right*)

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The proposed NSF face-off between the two projects was [recommended](#) in an August 2010 report from a National Academies' committee that looked at the instruments needed in the next decade to maintain U.S. leadership in astronomy and astrophysics. But that decadal survey was, at best, an informed wish list, and a top-rated project from the previous survey may still lack federal funding by the time the next one comes out.

Delays are even more likely this time around, admits Roger Blandford, a Stanford University astrophysicist who chaired the 2010 exercise. Even so, the panel felt that it was important for NSF to wade into the fray even if it's not clear when the winning proposal would be funded. It recommended that NSF carry out such a "downselect" within a year, explaining that "the projects are at a pivotal point where some form of commitment from the U.S. government at this time will encourage additional collaboration and is crucial to having the projects going forward at all."

NSF initially didn't see any reason to act that quickly. For starters, another telescope—the Large Synoptic Survey Telescope, ranked first by Blandford's panel—has been waiting several years to get into the queue of projects to be funded by the foundation's large equipment account. In addition, the account funds projects in all areas of science that NSF supports, meaning that the giant telescope must compete with large facilities serving other disciplines. Moreover, the current Congress seemed reluctant to provide enough money to fully fund projects already in the account. Finally, the long-range outlook was even dimmer as legislators sought ways to trim spending in order to shrink the \$1.3 trillion federal deficit.

Last week, however, a Senate spending panel gave NSF a strong push to start the downselect process. In a nonbinding but influential report accompanying the panel's proposed 2012 budget for the agency, the panel said that it "encourages NSF to follow the decadal survey's recommendation to develop a giant segmented mirror project." A few paragraphs later it says it "expects NSF to select [the project] for possible federal partnership by the end of calendar year 2011." That timeframe is consistent with the decadal survey but wildly optimistic with respect to the time it would take NSF, or any federal agency, to conduct such a review.

The Senate report has also sown some confusion, however, by directing that the telescope be "developed ... on domestic soil." That language seems designed to make it a one-horse race, since it appears to favor the Hawaii-bound TMT. All the parties involved say that applying such a criterion to the NSF review would be a very bad idea.

"I have yet to hear any astronomer argue for a 'domestic soil' location being a consideration in a downselect," says Blandford, who adds that it was not a part of the decadal survey or an earlier review of the two projects by another outside group, the Association for University Research in Astronomy. And Ellis says the geographic restriction appears to conflict with the Senate's desire for a rapid but real competition. "I don't understand how the two pages [in the Senate report] can be reconciled," he says. McCarthy agrees, noting that "it's hard to see how the two elements could work together."

The sense of urgency should be no surprise, says a spokeswoman for Senator Barbara Mikulski (D-MD), who chairs the spending subcommittee. "The subcommittee is pursuing its oversight responsibility by insisting the NSF makes a timely decision about its next big project," she says. The TMT team would also like NSF to step up to the plate, says Ellis. "The danger of delaying a downselect is that NSF could be sending a message to the international community that it may have a hard time meeting its future obligations in astronomy."

Nor is the subcommittee trying to exclude GMT from the running, according to Mikulski's spokesperson. "The subcommittee is not saying that," says the aide. "It's just saying develop it in the U.S."

Sources tell *ScienceInsider* that the geographic restriction comes from the chair of the full Appropriations Committee, Senator Daniel Inouye (D-HI), who prides himself on steering federally funded projects to his home state. Ellis admits that the TMT "is a very important project" for the state's economy, adding that Hawaiian politicians are very supportive of the telescope. But he says that the location was selected "for two reasons: The quality of the site, and the huge existing investments in infrastructure."

Identical language appeared in last year's appropriations bill for NSF, written before the decadal study appeared. But that legislation died when Congress instead adopted an all-encompassing agreement this spring that funded NSF and every other federal agency. That may happen again this year, but now that the Senate committee has told NSF to get a move on, it is unlikely that NSF officials will ignore their suggestions.

GMT's hesitation in accepting NSF's offer to enter the competition isn't based on any problems with the project

itself. McCarthy says the team hopes to break ground in Chile by the end of the year, regardless of its decision to participate in the NSF review, and cast the second primary mirror segment early in 2012. But he's not sure that NSF needs to act as quickly as the decadal study and Congress are urging it. "Making the best decision is more important than making the decision fast," he says. "If you cross the bridge before it's time, you'll just have to cross it again later."

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