



**National Science Foundation**  
**4201 Wilson Boulevard**  
**Arlington, Virginia 22230**

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## **Dear Colleague Letter: Plans for SAFOD Component of the EarthScope Program**

This letter is intended to describe National Science Foundation (NSF) plans for the future of the San Andreas Fault Observatory at Depth (SAFOD) component of the EarthScope Facility. SAFOD is one of three main components of the EarthScope Facility, a multipurpose geophysical and geological network supported by the Division of Earth Sciences (EAR) at NSF, operated and managed by IRIS and UNAVCO, and carried out in partnership with the US Geological Survey, NASA, and many other agencies and organizations. The Facility also includes the Plate Boundary Observatory (PBO) and USArray.

SAFOD's main purpose is to enable multidisciplinary research into the physical and chemical processes that govern the behavior of large plate-bounding faults. SAFOD was designed to meet this goal through (1) collection of seismic and other data from a long-term observatory installed inside a deep borehole drilled through the San Andreas Fault near Parkfield, California and (2) collection, curation, and distribution of physical samples from the borehole. Nearly two dozen research groups worldwide have used or are using SAFOD samples for a variety of investigations into the physical properties of material in an active plate boundary fault zone. In addition, more than two dozen research papers resulting from studies on SAFOD samples and data have been published in just the past two years. However, the long-term SAFOD observatory that was installed in September 2008 ceased operating shortly thereafter.

In 2010, NSF requested the Advisory Committee for Geosciences appoint an independent SAFOD Engineering Subcommittee to examine the events surrounding the deployment and subsequent malfunction of the 2008 observatory and to recommend technical approaches that would give a reasonable likelihood of successful installation and long-term operation of a new observatory. The committee's report and an extensive set of appendices, available at the EarthScope Web site ([http://earthscope.org/observatories/safod\\_report\\_Apr11](http://earthscope.org/observatories/safod_report_Apr11)), outline the committee's review process and describe a number of possible causes for the observatory malfunction in 2008. The report also provides several key recommendations, including that "a future observatory...must be formulated, constructed, and deployed in stages...over a multi-year time frame".

In parallel with the committee's work, NSF has consulted extensively with UNAVCO, our USGS partners, the EarthScope Steering Committee and SAFOD Advisory Committee, and the community about the future for SAFOD science. The EarthScope Steering Committee summarized the importance of SAFOD in a letter to NSF in July 2011 which stated in part that SAFOD "is an indispensable element of the core EarthScope Facilities [and] its continued operation and management as a community resource continues to be an essential and integral part of EarthScope science." This letter is in accord with the broad input we have received on SAFOD throughout this process. In short, we agree that SAFOD remains important for the Earth science we support through EarthScope.

In a final parallel thread, the community-elected Board of Directors of UNAVCO has considered UNAVCO's role as operators and managers of SAFOD. They have recommended that UNAVCO work with NSF to transfer the management of SAFOD to a new awardee. They feel that continued stewardship of SAFOD is neither well aligned with the scientific interests of the core community UNAVCO serves nor with UNAVCO's organizational mission, and that it is in the best interests of EarthScope and of UNAVCO that a new awardee take on this role. Accordingly, UNAVCO leadership has informed NSF they wish to work with us to transfer their responsibilities to a new awardee.

After considering all this input, and taking into account management and budgetary realities, and technical constraints, NSF intends to develop a new plan for the SAFOD component of the EarthScope Facility. In the short term:

- NSF intends to redefine the scope of the SAFOD Facility, and to seek a new awardee to manage and operate the redefined Facility. The successful awardee would be responsible for (a) overseeing curation and distribution of SAFOD physical samples through the Gulf Coast Repository at Texas A&M University; (b) overseeing operations and maintenance of the SAFOD vertical laser strainmeter through the University of California, San Diego; (c) overseeing management of existing SAFOD data; (d) working with UNAVCO to ensure a smooth transition to the new awardee; and (e) facilitating independent PI-driven research at SAFOD by liaising with USGS and with funded PIs on borehole access and scheduling, installation and removal of instruments, and related activities. We anticipate this competition will take

place in the next few months.

- NSF intends to invite proposals for principal investigator-driven (PI-driven) experiments using the SAFOD borehole through the annual EarthScope science solicitation beginning with the July 2012 deadline. These proposals would undergo the same review process as other EarthScope proposals, with the addition of review criteria designed to evaluate the technical feasibility of the proposed experiments inside the SAFOD borehole.

In addition, NSF will take a staged approach to a new long-term observatory at SAFOD, as recommended by the SAFOD Engineering Subcommittee and supported by the EarthScope Steering Committee. We anticipate the first step would be a workshop focused on borehole observatories for studies of earthquake and fault physics. The workshop would bring together experts from around the world to discuss scientific requirements and new technological developments for possible future borehole observatories, including SAFOD. We anticipate that collaborations would be enhanced by this workshop, which could lead to future proposals through NSF programs outside EAR as well as through other sources of funding beyond NSF.

Please contact Greg Anderson with questions or comments at [greander@nsf.gov](mailto:greander@nsf.gov) or 703.292.4693.

Sincerely,

Robert Detrick  
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