NATIONAL SCIENCE FOUNDATION
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ARLINGTON, VIRGINIA 22230

NSF 16-120

Dear Colleague Letter: Provision of Marine Seismic Capabilities to the U.S. Research Community

August 9, 2016

Dear Colleagues:

The Division of Ocean Sciences (OCE) of the National Science Foundation (NSF) is seeking written expressions of interest regarding the provision of marine seismic capabilities to the U.S. academic research community and Federal and state agencies involved with marine seismic research and exploration programs. This DCL is part of OCE's effort to develop a long-term, stable seismic capability.

OCE supports a broad portfolio of marine seismic acquisition methods on research vessels of the Academic Research Fleet. The primary seismic acquisition capability used by the U.S. academic community is currently provided by R/V *Marcus G. Langseth*, a 235-foot vessel owned by the NSF and operated by the Lamont Doherty Earth Observatory of Columbia University (LDEO). On average, the vessel is used by NSF for ~120-150 days per year, with funding from NSF at ~$14M per year, including technical support.

As part of OCE's reply in May, 2015, to the National Research Council's report "*Sea Change: Decadal Survey of Ocean Sciences, 2015-2025*", and via multiple outreach opportunities over the past year, NSF has made clear that the current business, financial, and resultant operational model for R/V *Langseth* is unsustainable. Contractual obligations and current research commitments are continuing to move forward using the vessel. Beyond early calendar year 2018, however, a different business, financial, and/or managerial model needs to be implemented or NSF/OCE is likely to divest from R/V *Langseth* and the vessel would no longer be available to researchers.

As noted in OCE's reply to *Sea Change*, NSF is committed to supporting marine seismic research of high national interest. Accordingly, OCE will continue to accept proposals for experiments that require capabilities such as those currently provided by the R/V *Langseth*. Many important scientific research topics such as understanding sea level change at multiple timescales, constraining processes involved in the construction and evolution of the oceanic lithosphere, assessing geohazards such as subduction megathrusts, landslides, and explosive volcanism, and defining magma supply systems underlying volcanoes in various tectonic settings, require specialized seismic infrastructure capable of operating throughout the global ocean. These and other scientific challenges are an important part of NSF's science programs in Marine Geosciences, in the Division of Earth Sciences, and for other targeted initiatives such as "Prediction of and Resilience Against Extreme Events" (PREEVENTS). These scientific objectives are also part of the science goals of other federal and state agencies.

Over the past year, OCE has worked with the research community, the University-National Oceanographic Laboratory System (UNOLS), and other stakeholders to make progress on seismic planning, including holding an important workshop to address the scientific and technological drivers of

the marine seismic community, establishing a Regional Framework Plan, and surveying the community for feedback regarding seismic research needs. This DCL is a component of NSF's continued engagement process.

Future Marine Seismic Support by NSF/OCE

OCE is seeking written expressions of interest regarding new financial and/or managerial models that would provide the marine seismic capabilities to meet the expected needs of academic research scientists. The expressions of interest may be oriented towards but not limited to one or more of the examples presented below, may or may not involve to varying degrees R/V *Langseth*, and should be cognizant of potential environmental compliance issues. Additionally, the expressions of interest should reflect that OCE anticipates spending an average of ~$8M per year for ship support and ~$2M for technical support, funding permitting, supporting seismic infrastructure that can achieve the scientific goals currently met by the capabilities provided by R/V *Langseth*.

Examples of possible approaches could include, but are not limited to, the following, with each subject to operating within the annual spending caps of ~$8M for ship operations and ~$2M for technical support:

1. A financial and operational change in the management of R/V *Langseth*. NSF would conduct an open solicitation for operation and management of R/V *Langseth* that would provide at a minimum the current technological capabilities of the vessel, and would meet the research needs of the academic community.

2. A change in the ownership of R/V *Langseth*. NSF would conduct an open solicitation for ownership of R/V *Langseth* that would provide NSF with an average of a to-be-determined number of days at sea per year to serve the U.S. academic research community. If NSF, as a Federal agency, no longer owns the vessel, the remaining R/V *Langseth* time would be available to support the business model of the new owner.

3. Use of other vessels for marine seismic data acquisition. If divested from R/V *Langseth*, NSF/OCE would work with academic, international, and/or commercial partners for potential access to third-party seismic capabilities, for a to-be-determined average number of days at sea per year, within budget constraints.

4. Use of alternative and/or developing technologies to supplement or supplant existing capabilities. NSF would be interested to learn of other creative approaches to meeting NSF's seismic research needs, such as enhanced large-scale deployments of Ocean Bottom Seismometers (OBSs), alternative sound sources, or other technologies that could either complement use of, or supplant the need for, R/V *Langseth*.

5. Development of alternative vessel scheduling plans including, for example, a multi-year scheduling plan in which large and complex marine seismic programs funded by NSF would be conducted only on a to-be-determined periodic basis. Such a schedule could align well with the community's parallel need for multiyear planning for complex research projects, and could also allow large uninterrupted blocks of time for non-NSF projects to be implemented by the provider.

Responses

OCE does not intend to limit in any way or direct potential responders toward a specific or single solution in terms of management, operational, or technological concepts. NSF is seeking responses based on both traditional single-organization management concepts, along with less-traditional, multi-partner

concepts, possibly involving joint public-private and/or international partnerships. OCE would also welcome hearing about other approaches, not provided in the list above, should the academic or commercial communities have further ideas.

Responders to this DCL may include U.S. institutions, universities, colleges, and other non-profit, non-academic organizations that would serve as the sole or lead organization. Consortia may include partnerships with commercial and/or international organizations. Any arrangement regarding the provision of marine seismic capabilities must be managed in the public interest with objectivity and independence, and with full disclosure of the operator's relevant affairs, including technical, financial, and programmatic performance, to NSF.

Please submit written responses by **November 11, 2016**. Responses to this request do not bind NSF to any further or specific actions related to this topic. This DCL is not a formal solicitation for proposals, and conveys neither a financial commitment nor a reflection of a final decision of the disposition of R/V *Langseth* or any other seismic infrastructure. To the extent that the sender plans to provide any information that it considers proprietary, such status must be unambiguously communicated and clearly marked. Participation is voluntary and comments received are intended for NSF internal use only. Comments received will not be posted publicly and the names of commenters will be protected from public disclosure to the extent permitted by law.

Responses, along with questions and comments, should be submitted in electronic form, via e-mail, to the signatories below.

Sincerely,

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Additional Sources of Information

Sea Change: http://www.nap.edu/catalog/21655/sea-change-2015-2025-decadal-survey-of-ocean-

sciences

Sea Change reply: https://www.nsf.gov/geo/oce/pubs/nsf-oce-sea-change-reply-may-11-2015.pdf

Seismic workshop report:
https://www.nsf.gov/geo/oce/pubs/Seismic_Workshop%20Report_final_2016.pdf

Langseth www site at LDEO: http://www.ldeo.columbia.edu/research/office-of-marine-operations/langseth

NSF Strategic Plan: https://www.nsf.gov/pubs/2014/nsf14043/nsf14043.pdf

GEO Visions document: https://www.nsf.gov/geo/acgeo/geovision/nsf_ac-geo_vision_10_2009.pdf

UNOLS Marine Seismics User Survey:
https://www.unols.org/sites/default/files/Marine_Seismic_Survey_All_Responses_160705.pdf

PREEVENTS: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504804

Regional Framework Plan for Marine Seismics
https://www.unols.org/committee/marcus-langseth-oversight-committee-mlsoc