Natural Hazards Engineering Research Infrastructure (NHERI)

Network Coordination Office, Computational Modeling and Simulation Center, and Post-Disaster, Rapid Response Research Facility

PROGRAM SOLICITATION
NSF 15-598

REPLACES DOCUMENT(S):
NSF 14-605

National Science Foundation

Directorate for Engineering
    Division of Civil, Mechanical and Manufacturing Innovation

Letter of Intent Due Date(s) *(required)* (due by 5 p.m. proposer's local time)**:**

October 16, 2015

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

November 04, 2015

IMPORTANT INFORMATION AND REVISION NOTES

The planned outcome of this solicitation is to establish the final three awards for the NSF-supported Natural Hazards Engineering Research Infrastructure (NHERI) - Network Coordination Office (NCO), Computational Modeling and Simulation Center (SimCenter), and Post-Disaster, Rapid Response Research (RAPID) Facility. The NCO, SimCenter, and RAPID Facility components for NHERI were originally competed under program solicitation NSF 14-605, Natural Hazards Engineering Research Infrastructure (NHERI) 2015-2019, but no awards for these components were made under that solicitation. Because the NCO, SimCenter, and RAPID Facility are integral awards for an integrated NHERI facility, this solicitation includes information about all four components of NHERI listed in NSF 14-605: NCO, Cyberinfrastructure (CI), SimCenter and Experimental Facility (EF). The RAPID Facility is considered part of the EF cohort. However, under this solicitation, proposals will only be accepted for the NCO, SimCenter, and RAPID Facility. All other proposals will be returned without review.

Proposers to this solicitation should carefully read through this entire solicitation, as revisions from NSF 14-605 to this solicitation have been made, most notably in Section II, Program Description; Section IV, Eligibility Information; Section V.A., Proposal Preparation Instructions; and Section V.B, Budgetary Information.

Compliance and Return without Review

Proposals submitted after the full proposal deadline of November 4, 2015, 5 p.m. proposer's local time, will be returned without review. Only those proposals submitted prior to the full proposal deadline and in full compliance with this solicitation and the Grant Proposal Guide (GPG) contained in the NSF Proposal & Award Policies & Procedures Guide (PAPPG) (NSF 15-1) will be accepted for review. Proposers are strongly encouraged to submit their proposal to this solicitation at least several days in advance of the full proposal deadline, so that the submitting institution's Sponsored Projects Office, Principal Investigator (PI), and co-PIs can download the submitted proposal, review it for completeness and compliance with the proposal preparation instructions in this solicitation and the GPG, and make revisions needed to bring the proposal into compliance prior to the full proposal deadline. If the proposal is submitted by the proposal deadline, then the Division of Civil, Mechanical and Manufacturing Innovation will allow proposers to self-check their proposal for compliance and submit proposal file update(s) with corrections by November 6, 2015, 5 p.m. proposer's local time, after the full proposal deadline. The proposal file update(s) will be accepted by NSF. CMMI staff will not give proposers feedback on compliance before the November 6, 2015, 5 p.m. proposer's local time deadline for submitting proposal file updates. Note that FastLane has implemented automated compliance checks for certain sections of proposals during submission, and FastLane may reject the submission for noncompliance with these checks. This rejection may delay proposal submission, which will result in return without review if the proposal submission time stamp is after the full proposal deadline. After November 6, 2015, the CMMI Division will then check proposals for compliance with the proposal preparation instructions in this solicitation and the GPG. Noncompliant proposals will result in return without review. Appendix X of this solicitation provides a full proposal compliance checklist.

Important Information

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised NSF Proposal & Award Policies & Procedures Guide (PAPPG) (NSF 15-1), which is effective for proposals submitted, or due, on or after December 26, 2014. The PAPPG is consistent with, and, implements the new Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (Uniform Guidance) (2 CFR § 200).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Natural Hazards Engineering Research Infrastructure (NHERI)

Network Coordination Office, Computational Modeling and Simulation Center, and Post-Disaster, Rapid Response Research Facility

Synopsis of Program:

The planned outcome of this solicitation is to establish the final three awards for the NSF-supported Natural Hazards Engineering Research Infrastructure (NHERI) - Network Coordination Office (NCO), Computational Modeling and Simulation Center (SimCenter), and Post-Disaster, Rapid Response Research (RAPID) Facility. The NCO, SimCenter, and RAPID Facility components for NHERI were originally competed under program solicitation NSF 14-605, Natural Hazards Engineering Research Infrastructure (NHERI) 2015-2019, but no awards for these components were made under that solicitation. Because the NCO, SimCenter, and RAPID Facility are integral awards for an integrated NHERI facility, this solicitation includes information about all four components of NHERI listed in NSF 14-605: NCO, Cyberinfrastructure (CI), SimCenter, and Experimental Facility (EF). The RAPID Facility is considered part of the EF cohort. Under this solicitation, proposals will only be accepted for the NCO, SimCenter, and RAPID Facility. All other proposals will be returned without review.

NHERI is the next generation of National Science Foundation (NSF) support for a natural hazards engineering research large facility, replacing the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES). NEES was established by NSF as a distributed, multi-user, national research infrastructure for earthquake engineering through a facility construction phase during 2000 - 2004, followed by operations of this infrastructure to support research, innovation, and education activities from October 2004 through September 2014.

NHERI will be a distributed, multi-user, national facility that will provide the natural hazards engineering community with access to research infrastructure (earthquake and wind engineering experimental facilities, cyberinfrastructure, computational modeling and simulation tools, and research data), coupled with education and community outreach activities. NHERI will enable research and educational advances that can contribute knowledge and innovation for the nation's civil infrastructure and communities to prevent natural hazard events from becoming societal disasters.

NHERI will consist of the following components, established through separate awards:

- NCO - one award to be made under this solicitation;
- SimCenter - one award to be made under this solicitation;
- Experimental Facility: RAPID Facility - one award to be made under this solicitation;
- CI - one award made under NSF 14-605; and
- Experimental Facilities for earthquake engineering and wind engineering research - six or seven awards made under NSF 14-605.

Under this solicitation, one cooperative agreement for the NCO, one cooperative agreement for the SimCenter, and one cooperative agreement for the RAPID Facility are anticipated to commence in early calendar 2016, with a five-year award duration. These three Awardees will not conduct research. The primary research enabled by NHERI will be conducted by investigators supported through separate NSF awards. The NCO, SimCenter, and RAPID Facility Awardees, along with the other NHERI Awardees and the natural hazards engineering community, will work together, through Governance and Awardee activities, to establish a shared vision for NHERI, set natural hazards engineering research and education agendas and priorities, and make NHERI a value-added and productive research infrastructure.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Joy M. Pauschke, Program Director, Division of Civil, Mechanical and Manufacturing Innovation (Lead Cognizant Program Officer), telephone: (703) 292-7024, email: jpauschk@nsf.gov

- William L. Miller (CISE/ACI), Science Advisor, Division of Advanced Cyberinfrastructure, telephone: (703) 292-7886, email: wlmiller@nsf.gov

- Erica Stein, Grants and Agreements Specialist, Division of Acquisition and Cooperative Support, telephone: (703) 292-5399, email: digiovanna-stein@nsf.gov

- Deanna DiGiovanna, Grants and Agreements Specialist, Division of Acquisition and Cooperative Support, telephone: (703) 292-4374, email: digiovanna-stein@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.041 --- Engineering

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 3

Up to three awards as follows:

- One award for the Network Coordination Office (NCO).
- One award for the Computational Modeling and Simulation Center (SimCenter).
- One award for the Post-Disaster, Rapid Response Research (RAPID) Facility.

Anticipated Funding Amount: $19,100,000

The anticipated funding amount of $19,100,000 is the estimated total for up to five years for up to three awards (three Awardees). The table below shows the anticipated annual base budget support for each Awardee, contingent upon the annual budgets of NSF, the annual performance of the Awardee, and the extent of utilization of Awardee resources by NSF-supported research and education awards. For the RAPID Facility Awardee, a one-time budget increase of up to $1,200,000 in year two will be available for new equipment acquisition and commissioning, contingent upon the outcome of the year one merit review and NSF approval.

Additional support, either through an increase in the base budget or as a supplement, may be provided as follows, contingent upon annual appropriations for NSF and NSF approval:

- For all Awardees, as appropriate, to support annual Council work plan activities.
- For the RAPID Facility, to repair damaged equipment, based on the Special Award Conditions listed in Section VII.B, Award Conditions.

Anticipated Annual Support					
Awardee	Year One	Year Two	Year Three	Year Four	Year Five
Network Coordination Office award base budget	$700,000	$900,000	$900,000	$900,000	$700,000
Computational Modeling and Simulation Center award base budget	$2,000,000	$2,200,000	$2,300,000	$2,200,000	$2,200,000
Post-Disaster, Rapid Response Research Facility award base budget	$500,000	$1,800,000	$600,000	$600,000	$600,000

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.

Who May Serve as PI:

The PI must be a full-time employee of the lead institution by the start date of the NSF cooperative agreement award.

Limit on Number of Proposals per Organization: 2

An academic institution may submit up to two proposals as the lead institution, but may not submit more than one proposal as the lead institution in any one of the following three proposal categories:

1. Network Coordination Office (NCO),
2. Computational Modeling and Simulation Center (SimCenter), and
3. Post-Disaster, Rapid Response Research (RAPID) Facility.

A full proposal involving more than one organization must be submitted as a single administrative package from the lead institution; collaborative full proposals with multiple administrative packages will not be accepted and will be returned without review. If the Principal Investigator of a full proposal leaves or transfers to another institution during the review process or after an award is made, the proposal/award remains with the lead institution. Additionally, the lead institution cannot be changed after submission of the full proposal. National laboratories and private sector companies, as well as non-U.S. institutions, may participate in NHERI award activities using their own resources and cannot receive NSF support from an award made under this solicitation; however, this shall not be interpreted to prohibit purchases, services, or sales contracts/agreements with these entities. A proposal for the RAPID Facility must have all facility resources owned, operated, and maintained by the lead institution and located within the United States to facilitate access by NSF-supported users.

Limit on Number of Proposals per PI or Co-PI: 1

An individual may appear as Principal Investigator (PI) or co-PI in no more than one full proposal. Applicants are responsible for ensuring that no individual is listed as PI or co-PI in more than one proposal. If an individual is included as PI or co-PI in two or more proposals submitted by the full proposal deadline, then the first proposal submitted, based on the FastLane system time stamp, will be deemed the one allowable submission. All subsequent proposals that include the individual as PI or co-PI will be returned without review.

Furthermore, a PI or co-PI may serve as PI or co-PI on only one award made under NSF 14-605 and this solicitation, i.e., a PI or co-PI named on an award made under NSF 14-605 may not serve as a PI or co-PI on an award made under this solicitation. A proposal submitted to this solicitation with a PI or co-PI named on the NSF proposal cover sheet who receives an award under NSF 14-605 will be returned without review. NSF will not allow substitutions of PIs and co-PIs on proposals and/or subsequent awards to circumvent this requirement.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required. Please see the full text of this solicitation for further information.

- **Preliminary Proposal Submission:** Not required

- **Full Proposals:**

  - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
  - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)

B. Budgetary Information

- **Cost Sharing Requirements:** Inclusion of voluntary committed cost sharing is prohibited.

- **Indirect Cost (F&A) Limitations:** Not Applicable

Other Budgetary Limitations: Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Letter of Intent Due Date(s)** *(required)* (due by 5 p.m. proposer's local time)*:*

    October 16, 2015

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

    November 04, 2015

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements: Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

This section provides an overview of the Natural Hazards Engineering Research Infrastructure (NHERI), which originally was described and competed under program solicitation NSF 14-605, Natural Hazards Engineering Research Infrastructure (NHERI) 2015-2019. NSF 14-605 competed the four NHERI components: Network Coordination Office (NCO), Cyberinfrastructure (CI), Computational Modeling and Simulation Center (SimCenter), and Experimental Facility (EF), which included a post-disaster, rapid response research (RAPID) Facility. No awards for the NCO, SimCenter, and RAPID Facility, however, were made under NSF 14-605. This solicitation only requests proposals for the NCO, SimCenter, and RAPID Facility, and Section II provides further description of these three components. Proposals submitted to this solicitation for any of the other components, i.e., CI and an EF other than a RAPID Facility, will be returned without review.

A. Introduction

During the past several decades, the United States has experienced major earthquake and windstorm (e.g., tornado and hurricane) events, resulting in loss of life, injuries, extensive damage, and loss of basic services vital for post-disaster response and recovery. Such impacts have led to long recovery periods for communities, states, and the nation. The use of experimental testing, computational modeling and simulation, research data, and their integration with theory have become increasingly important research resources to create the knowledge and innovation needed to mitigate the impact of earthquakes and windstorms on our nation's physical civil infrastructure: buildings and other structures, underground structures, and critical lifelines such as communications, energy, transportation, and water/wastewater systems (References 1-6, Section IX).

The National Science Foundation (NSF) has supported the construction (fiscal year (FY) 2000 - 2004) and operations (FY 2005 - 2014) of distributed, multi-user, national earthquake engineering research infrastructure (experimental facilities and cyberinfrastructure) through the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES). Through use of NEES, NSF-supported researchers have advanced fundamental knowledge about the seismic performance of civil infrastructure and created sustainable technologies for structural design, structural rehabilitation, and site remediation; computational, simulation, and visualization research tools; experimental simulation techniques and instrumentation; and sensor technologies. In addition, researchers have deployed NEES equipment, sensors, and data acquisition systems to capture large aftershock building response and generate site profiling data following the 2010 Chile and 2010/2011 New Zealand earthquakes. NEES operations was managed under a five-year cooperative agreement during FY 2010 - FY 2014 with Purdue University, hereinafter referred to as the "incumbent." The NEES research infrastructure supported by the incumbent is described at http://www.nees.org. NSF's support for operations of the NEES experimental facilities and research ended on September 30, 2014. However, through NSF support, the incumbent will continue to operate only the NEEShub cyberinfrastructure through September 30, 2015, to provide continued operations for the research community and to assist the NHERI CI Awardee with the cyberinfrastructure transition.

NHERI will be a distributed, multi-user, national facility that will provide the natural hazards engineering community with access to research infrastructure (earthquake and wind engineering experimental facilities, cyberinfrastructure, computational modeling and simulation tools, and research data), coupled with education and community outreach activities. NHERI will enable the community to make research and educational advances collaboratively that can contribute knowledge and innovation to prevent natural hazards from becoming societal disasters. This knowledge base could potentially transform how future civil infrastructure will be designed and how existing civil infrastructure might be rehabilitated.

In accordance with the National Science Board (NSB) Statement on Competition, Recompetition, and Renewal of NSF awards (NSB-08-16) (http://www.nsf.gov/nsb/publications/2008/nsb0816_statement.pdf), NHERI will be openly competed and will consist of the following components/awards:

- NCO - one award made under this solicitation;
- SimCenter - one award made under this solicitation;
- RAPID Facility - one award made under this solicitation;
- CI - one award made under NSF 14-605; and
- EF for earthquake engineering and wind engineering research - six or seven awards made under NSF 14-605.

For all NHERI awards, the lead institution on each cooperative agreement, hereinafter referred to as the "Awardee" in this solicitation, together with all its partner organizations and others supported on the award, are responsible for complying with the terms and conditions of the cooperative agreement. The primary research enabled by NHERI will be conducted by investigators supported through separate NSF awards.

B. Role of NHERI Operations

The NSF awards for NHERI made under NSF 14-605 and this solicitation will contribute to NSF's roles in the National Earthquake Hazards Reduction Program (http://www.nehrp/gov) and the National Windstorm Impact Reduction Program. NHERI's earthquake engineering components and activities will form the successor to NEES.

NHERI will be part of the NSF-supported portfolio of large, multi-user facilities. The NSF Large Facilities Manual (NSF 15-089) (http://www.nsf.gov/pubs/2015/nsf15089/nsf15089.pdf) provides information about the development, construction, and operations of NSF-supported large facilities. As an NSF-supported large facility, within the first two years of the award, Awardees may undergo an NSF business systems review in accordance with the NSF Business Systems Review Guide (NSF 13-100) (http://www.nsf.gov/pubs/2013/nsf13100/nsf13100.pdf).

C. General Information and Frequently Asked Questions

For additional information on this solicitation and NSF policies, please contact the Lead Cognizant Program Officer listed in this solicitation. All questions received will be responded to only through a Frequently Asked Questions (FAQ), to be posted on www.nsf.gov. Questions will not be individually answered. Questions submitted less than four weeks prior to the full proposal deadline will not be answered.

D. Informational Webcast/Webinar

NSF intends to hold an informational webcast/webinar prior to the due date of the Letter of Intent. The date and further information about the webcast/webinar will be distributed through NSF's delivery service, which may be subscribed to at NSF's website (https://public.govdelivery.com/accounts/USNSF/subscriber/new?topic_id=USNSF_179).

II. PROGRAM DESCRIPTION

NSF 14-605 competed the four NHERI components: Network Coordination Office (NCO), Cyberinfrastructure (CI), Computational Modeling and Simulation Center (SimCenter), and Experimental Facility (EF), which included a post-disaster, rapid response research (RAPID) Facility. No awards for the NCO, SimCenter, and RAPID Facility, however, were made under NSF 14-605. To complete NHERI, this solicitation requests proposals only for the NCO, SimCenter, and RAPID Facility, which are described below in Sections II.B through II.F. Proposals submitted to this solicitation for any other component, i.e., CI and an EF other than a RAPID Facility, will be returned without review. Because the NCO, SimCenter, and RAPID Facility integral awards for an integrated NHERI facility, this section includes information about the overall concept for NHERI originally described in NSF 14-605 and the four components of NHERI listed in NSF 14-605: NCO, CI, SimCenter, and EF.

A. Vision for NHERI

NHERI will support multi-hazards engineering research and education, with a focus on earthquake and wind engineering. Historically, research on physical civil infrastructure materials, design, and performance has focused on resilience for a single natural hazard. However, civil infrastructure designed to be multi-hazard resilient will contribute toward broader societal goals, i.e., protect people and property, maintain continuity in essential operations and services, and recover rapidly from a natural hazard event. Design of civil infrastructure is also changing, as strategies for green civil infrastructure are emerging, addressing societal goals for a sustainable nation. Examples of sustainable strategies include sustainable materials, minimization of non-renewable energy use, use of on-site renewable energy source(s), and maximization of material reuse and recyclable components. However, civil infrastructure designs for single hazard resilience do not always take advantage of new technologies for sustainable civil infrastructure and may not provide multi-hazard resilience. NHERI will support research on sustainable civil infrastructure for resilience to single and multiple hazards, such as earthquakes and windstorms.

NHERI will enable research and education that can contribute knowledge and innovation for civil infrastructure, over its lifespan, to be multi-hazard resilient and sustainable. NHERI will also support NSF's core value to broaden opportunities and expand participation of groups, institutions, and geographic regions that are underrepresented in science, technology, engineering, and mathematics (STEM) (Reference 7, Section IX). NSF is committed to this principle of inclusiveness.

The vision for NHERI is to enable frontier research and education to:

- Understand, model, and predict the lifecycle performance of civil infrastructure, from component to holistic system levels, under different natural hazard events;
- Reduce the reliance on physical testing for modeling the performance of civil infrastructure under natural hazard events through advanced computational modeling and simulation capabilities;
- Build the basic science knowledge and computational modeling and simulation capabilities to evaluate multi-hazard resilient and sustainable civil infrastructure and communities;
- Translate research into innovative mitigation strategies and technologies to reduce the impact of natural hazards on existing and new sustainable civil infrastructure and communities; and
- Integrate research, education, and outreach to train a broad and inclusive STEM workforce to conduct and translate research into an innovation ecosystem for multi-hazard resilient and sustainable civil infrastructure and communities.

B. NHERI Construct: Operational Goals and Governance, Awardee, and User Roles

To support this vision, the operational goals for NHERI are the following:

- Effective Council of Awardees (hereinafter referred to as the Council), which provides the collective and coordinated leadership for NHERI to operate as an integrated, cohesive, and transparent national facility in service to the natural hazards engineering community;
- Excellence in Awardee leadership, management, award administration, performance assessment, user support, and safe and secure operations of its resources, services, and data infrastructure;
- Active involvement of the natural hazards engineering community in Governance and Awardee activities;
- Open and equal access to NHERI, with NHERI used by an external and broadly inclusive user base of researchers and educators;
- Evidence-based development of the current and next generation workforce to conduct natural hazards engineering research, educational activities, and professional practice; and
- Value-added strategic partnerships that bring additional unique national and international resources and capabilities to NHERI.

The NHERI construct will consist of the Awardees (NCO, CI, SimCenter and EF), Governance, and Users, with the role for each outlined below in Tables 1, 2, and 3, respectively. The RAPID Facility is considered part of the EF cohort. The Awardees and user community will work together, through Awardee and Governance activities, to establish a shared community vision for NHERI, set natural hazards engineering research and education agendas and priorities, and make NHERI a value-added and productive national facility.

Awardees: The awards will have the roles shown in Table 1; the requirements and responsibilities for all Awardees and for each component/Awardee are outlined later in this section.

Table 1. Awardees	
Component	**Role**
NCO	The NCO will serve as the scientific national and international leader, community focal point, and network-wide coordinator for Governance, cross-Awardee, and community-building activities. Key activities will include convening the Governance groups, working with the Council to develop consensus-based policies and procedures for NHERI and the annual Council work plan, implementing the Facility Scheduling Protocol to provide users access to the EFs, leading development of the NHERI Science Plan, running NHERI-wide education and community outreach programs, and building strategic partnerships.
CI	The CI Awardee will serve as the integrator for enabling NHERI to be a virtual organization for the natural hazards engineering community, by providing an array of information, resources, and services, including the definitive NHERI website, NHERI data repository, software service delivery platform with computational modeling, simulation, and educational tools, collaboration tools, access to computing resources, and user training and support. The CI Awardee will establish and implement a NHERI-wide cybersecurity plan with all Awardees.
SimCenter	The SimCenter will develop and deliver to the CI Awardee for integration onto the CI Awardee's software service delivery platform, a portfolio of computational modeling and simulation software and educational modules that reflects a balance of community-prioritized, new capabilities for earthquake, wind, and multi-hazard engineering research and education. The Awardee will provide training and technical support to users of its software tools.
EF, including RAPID Facility	Each EF will provide resources, services, and staffing to enable earthquake engineering, wind engineering, or post-disaster, rapid response research. Each EF will provide a well-maintained and fully functioning facility and support users who are provided access through the NCO's Facility Scheduling Protocol. Data generated by EF resources and its users will be archived in the NHERI data repository.

Governance: The Governance structure will be implemented through the four groups shown in Table 2. The "Committees" group may include multiple committees. Each group, including each separate committee under "Committees," will publish an Annual Community Report on the NHERI website. For each of these groups, the names of member organizations and names, including chair positions, must not be included in proposals; rather these groups will be appointed post-award by either the NCO or the user community. The number of in-person meetings to be budgeted for by the NCO is listed in Table 2; for additional meetings, travel costs should be minimized through the use of electronic communication and videoconferencing.

Table 2. Governance			
Group	**Role**	**Membership**	**Meeting Frequency**
Council	To provide collective and coordinated leadership for NHERI as a national facility.	All Awardee Principal Investigators (PIs).	At least quarterly.
Network Independent Advisory Committee (NIAC)	To provide independent guidance and advice to the Council on the following: (a) progress, plans, and performance of the Awardees and annual Council work plan, (b) an assessment of the level of community engagement and user satisfaction across NHERI, with input from the User Forum survey results, (c) an assessment of NHERI's continuing value added for and impact on research and educational advancements, and (d) assessment of the transparency and efficiency of the NCO's Facility Scheduling Protocol.	Diverse representation from the broad scientific and engineering communities served by NHERI. Members may not be from an Awardee institution. The NCO will appoint the NIAC members, with input from the Council.	At least semi-annually, with one in-person meeting annually.
User Forum	To provide the Council with independent advice on community user satisfaction, priorities, and needs relating to the use and capabilities of NHERI. Through financial and secretariat support provided by the NCO, the User Forum will conduct annual community user satisfaction surveys for NHERI. Representatives from the User Forum will participate as observers in the NCO's Facility Scheduling Protocol.	User representatives from the broad scientific and engineering communities served by NHERI, elected by the user community; members may not be from an Awardee institution.	At least semi-annually; with one in-person meeting annually.

Committees	To advise the Council on community priorities and needs for NHERI, serving and benefiting multiple Awardees and avoiding duplication of effort and costs among Awardees. The Committee structure will be established by the Council.	Dependent upon purpose; may consist of community/user representatives and/or cross-Awardee staff. The NCO will appoint the committee members, with input from the Council.	Dependent upon purpose of each committee.

Users: Users will contribute to and participate in NHERI, as appropriate, as shown in Table 3.

Table 3. Users	
Composition	**Role**
Users will come from the natural hazards engineering and related communities, including groups, regions, and institutions underrepresented in STEM, and may include both U.S. and international users.	Conduct research and education activities using NHERI's resources and services. An EF may require that users pay user fees/recharge rates to cover costs not supported by the NSF NHERI award; therefore, users should check with the EF before submitting an NSF proposal.
	Contribute computational modeling, simulation, and educational tools to NHERI.
	Participate in Awardees' activities.
	Provide input on the NHERI Science Plan for future research and education directions.
	Serve on Governance groups to represent the priorities, needs, requirements, and feedback from the user community.
	Provide feedback in user satisfaction surveys.

Figure 1 shows a notional diagram for the NHERI construct.
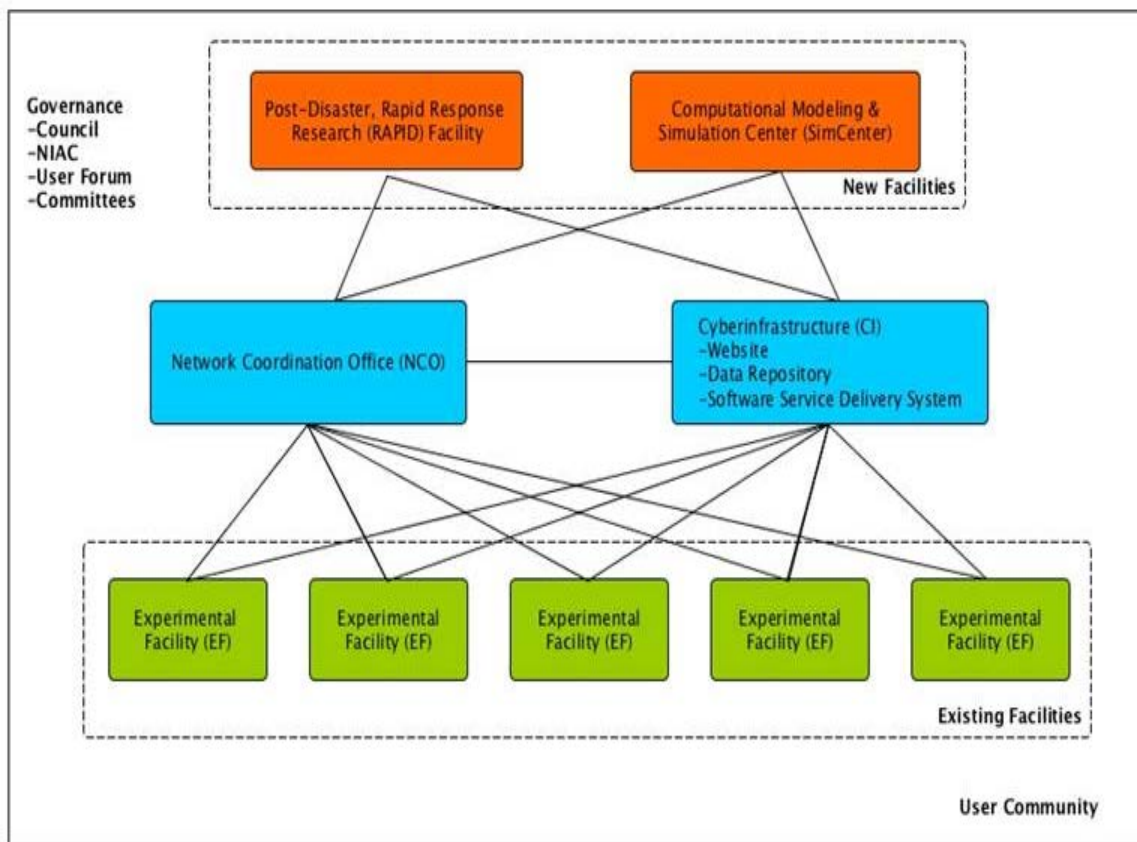

Figure 1. Notional NHERI Construct

C. All Awardees (NCO, CI, SimCenter, and EF, including the RAPID Facility) - Common Awardee Requirements and Responsibilities

Note: Proposals submitted to this solicitation for the NCO, SimCenter, and RAPID Facility components must address these Common Awardee Requirements and Responsibilities.

Requirements

1. *Project Headquarters:* Each Awardee will provide sufficient co-located campus space, resources, and Internet and Internet2 connectivity to support the project leadership, management, operations, activities, collaborations, and users.
2. *Organizational Structure and Staffing:* Each Awardee will establish and maintain an organizational structure and staff capable of effectively leading, planning, managing, implementing, overseeing, assessing, and reporting on its award. There should be active lead institution oversight, clear lines of authority, identified project roles and responsibilities, and lines of communications and interactions with the Governance, other Awardees, users, and the broader natural hazards engineering community. The Awardee PI will be the Director of the NHERI component, should be a distinguished earthquake engineering or wind engineering researcher, will lead the scientific and operational vision for the component, and will serve on the Council. The PI and co-PI team should collectively demonstrate multidisciplinary, senior-level expertise across the breadth of the natural hazards considered and the scope of the project. Additional staff are to be commensurate with the breadth of the natural hazards considered and the scope of the project, and should also

include expertise in cybersecurity and its implementation. The project staffing demographics should strengthen NHERI's role in increasing participation by groups that are underrepresented in STEM. Additional staffing requirements are listed below for each NHERI component.

Responsibilities

1. *Participation in the Council:* The Council will be led, organized, and convened by the NCO. Awardees will participate in the following activities:
   - Establish the Council Charter and Operating Procedures;
   - Develop consensus-based policies and procedures for NHERI resources, activities, data sharing, and user access, adapting policies and procedures implemented for NEES as applicable (see http://nees.org/aboutnees/policies);
   - Contribute the Awardee's Science Plan to the five-year *NHERI Science Plan*, which outlines community-prioritized research and education directions for NHERI, building upon the Awardees' Science Plans, NHERI vision, and broadly obtained community input;
   - Develop the consensus-based annual Council work plan for the next award period, for cross-Awardee activities and operational efficiencies, to make NHERI greater than the sum of the parts. Each Awardee's scope identified in the Council work plan will be incorporated into its individual annual work plan, schedule and NSF budget request for next year support. Examples of cross-Awardee activities might include acquisition of shared facility instrumentation, development of software needed for operations by a subset of Awardees, and coordinated community outreach activities;
   - Participate in two NIAC meetings per year, to provide input on Awardee resource utilization, progress, plans, performance assessment, and community impact, receive recommendations to improve operations, and respond to recommendations;
   - Establish the committee structure and membership; participate in meetings relevant to Awardee scope;
   - Publish an Annual Council Community Report on the NHERI website, summarizing the Council's current year progress, activities, and community impact and informing the community of the Council's plans for the next year; and
   - Other activities determined by the Council;
2. *Science Plan:* Each Awardee will operate with a Science Plan that supports the NHERI vision in Section II.A. The Science Plan should outline: the compelling scientific vision, grand research challenges, the key research questions at the cusp of emerging discoveries for earthquake, wind, and/or multi-hazards engineering, and potential technical breakthroughs that can be enabled by the proposed component; the major resources, services, and activities to be provided to support investigation of these research questions; and the expected user base for each major resource, service, and activity. The Awardee's plan will contribute to the NHERI Science Plan to provide users with the research questions that NHERI can facilitate;
3. *Operations:* Each Awardee will be guided by its project management plan for operations, which will incorporate the NHERI operational goals and role of the component in Section II.B and the requirements and responsibilities for all Awardees and for the specific NHERI component as outlined in this section, to include the following:
   - *Strategic Plan for Operations,* with vision, goals, objectives, key deliverables, milestones, performance metrics and targets for the metrics. The metrics should assess performance, include qualitative and quantitative measures, and track staffing, user, and activity participant demographics and community utilization of major resources and services;
   - *Marketing and Broadening Participation Plan for Developing the User Base;*
   - *Project Management and Performance Assessment*, with leadership; management, business, financial, and human resources systems; policies and procedures; and performance assessment mechanisms for tracking activities, schedule, progress, deliverables, budget, expenditures, program income, and staffing levels against the work plan and performance metrics. There should be mechanisms for incorporating feedback from the Governance groups and users to evaluate progress, effectiveness, impact, and evolving stakeholder priorities and needs;
   - *Work Breakdown Structure (WBS) and Dictionary,* which define the complete Awardee scope and deliverables;
   - *Annual Work Plan,* aligned with the Strategic Plan for Operations, WBS, and annual Council work plan, which identifies activities, tasks, deliverables, schedule and budget for the annual award period;
   - *Cybersecurity Plan and Implementation,* coordinated with the CI Awardee; and
   - *Risk Management Strategy and Plan,* including a risk assessment matrix;
4. *Education and Community Outreach (ECO) Program:* ECO activities should be strategically planned, well-principled, and appropriate for the target audience; broaden participation of groups, regions, and institutions underrepresented in STEM; and use appropriate assessment mechanisms. The ECO activities must be integral to the intellectual merit proposed by the Awardee and require use of resources provided under the NHERI award. ECO activities will be a combination of NHERI-wide and Awardee-specific activities, with NHERI-wide activities to include participation by all Awardees in the following activities:
   - NCO-organized Research Experiences for Undergraduates (REU) site program, with each Awardee hosting at least two REU students;
   - NCO-organized NHERI Summer Institute for early career faculty and graduate students; and
   - Awardee activity information provided frequently to the CI Awardee to post on the NHERI website. Awardees will not develop and maintain separate websites; and
5. *Software Development and Lifecycle Management Plan,* to be established by each Awardee to include:
   - Scientific justification for the software in terms of gaps in existing software capabilities, documented user requirements, and targeted user community (size and composition of expected user base);
   - Identification of the software license to be used for the software release, and why this license is chosen;
   - Use of open source software, where appropriate or applicable, and leveraged investments made by NSF and other Federal agencies for software, data management infrastructure, campus and/or national high performance and distributed computing resources, and other cyberinfrastructure and software tools;
   - Software architecture and technology required, including dependence on other software, projects, and systems, and interoperability with widely used community tools;
   - Lifecycle management: development, deployment, testing, validation, and verification, use of testbeds, maintenance, staffing, user training and support, and budget, including the tasks necessary to take the software from prototype to delivery as a reusable software resource and an assessment plan with metrics to measure success and failure of the new software;
   - Potential risks, including risks associated with establishment and execution, necessary infrastructure and associated technologies, community engagement, and long-term support; and
   - Plan to integrate content and tools so as not to preclude sharing and future porting without renegotiation of proprietary agreements.

D. Network Coordination Office (NCO) Component - Additional Awardee Requirements, Responsibilities, and Key Year-One Milestones

Note: Proposals submitted to this solicitation for the NCO component must address these NCO Component - Additional Awardee Requirements, Responsibilities, and Key Year-One Milestones.

Requirements

Staffing (in addition to Section II.C): The NCO Director (NCO Awardee PI) also should have prior accomplishments in the following: (a) strategically leading and managing distributed resource projects, (b) leading a research community to advance knowledge frontiers, (c) implementing technology transfer and innovation for natural hazards mitigation, and (d) broadening participation of groups, regions, and institutions underrepresented in engineering. Additional staffing should include the following: a full-time experienced EF Scheduler, with expertise in scheduling users among distributed resources and resource scheduling software; secretariat support for the Governance

groups; and scientific and educational expertise for ECO activities, with skills in the use of a wide variety of media, formal and informal science and engineering outreach activities for targeted audiences, evaluation and assessment, REU site and Summer Institute program administration, broad stakeholder engagement, workforce development, printed and web-based publications, cataloging information, and graphic arts.

Responsibilities

1. *Governance Support:* Organize, convene, and provide secretariat support for all work of the Governance. The NCO will appoint the NIAC and committee members, with input from the Council. The NCO must fully budget for travel support for Governance group members external to the Awardees, budget for and organize the election of the User Forum, and provide assistance and financial support for the User Forum to conduct its annual community user satisfaction surveys. The NCO will post Governance meeting minutes on the NHERI website;
2. *Facility Scheduling Protocol:* To support transparent, open, and equal access to NHERI EF resources, the NCO Awardee, rather than each EF Awardee, will be responsible for scheduling user time (NSF-supported and non-NSF-supported) at each EF, including the RAPID Facility. The NCO must successfully implement a centralized Facility Scheduling Protocol, with the NCO EF Scheduler working with all EF Awardees, the User Forum, and users. The Protocol should address scheduling policies and procedures for EF user access and metrics for measuring wait time in queues and throughput. The NCO will use software for scheduling individual facility resources and users, develop and maintain a Facility Scheduling Dashboard on the NHERI website, and implement processes for NSF-supported investigators to initially request EF utilization through forms that could be included in all NSF proposals requesting access and for non-NSF supported users (or for an EF Awardee on behalf of these latter users) to request access;
3. *Annual Council Work Plan:* To be developed with the Council for joint Awardee activities, to be completed before Awardee Annual Plans must be submitted with NSF Annual Progress Reports;
4. *Five-Year NHERI Science Plan:* Lead and organize development of the five-year NHERI Science Plan that will serve as a resource for the community to develop research and education proposals for submission to NSF funding opportunities;
5. *Strategic Experimental Facility Partnerships:* Post-award, develop and implement strategic key partnerships with major and unique experimental facilities (national and international) to enhance the scientific experimental resources and support that can be available to the natural hazards engineering research community; and
6. *ECO Program:* In accordance with the responsibilities listed in Section II.C, organize and budget for the NHERI-wide ECO program, working with the other Awardees, to include:
   - An annual NHERI-wide REU site program, organized, conducted, and budgeted for in accordance with the NSF REU program solicitation, NSF 13-542, http://www.nsf.gov/publications/pub_summ.jsp?WT.z_pims_id=5517&ods_key=nsf13542, or successor solicitation(s) in effect at the time of implementation;
   - An annual NHERI-wide Natural Hazards Engineering Research Summer Institute, budgeted for to include full participant support costs;
   - Activities to engage an active and expanded natural hazards engineering community to become productive users of and contributors to NHERI through outreach to groups, regions, and institutions underrepresented in STEM and natural hazards engineering research, and facilitating collaborations for research and education among users;
   - Facilitation of the community to organize campaigns and teams to conduct research and education in support of the five-year NHERI Science Plan; and
   - Information dissemination about NHERI resources, activities, research outcomes, accomplishments, and impact, posted on the NHERI website, to include:
     - Major highlights and syntheses of NHERI research and education outcomes, through forums such as newsletters, reports, speaker series, workshops, special conference sessions, web-posted case studies, and special journal editions or monographs;
     - Community notification about upcoming activities and committee meetings;
     - An active social media presence that engages a variety of communities; and
     - Web-based catalog of journal and other publications describing research, educational, and workforce development outcomes enabled by NHERI.

Key Year-One Milestones

- *Within six months of award,*
  - Governance groups established and all groups met at least once.
  - Facility Scheduling Protocol implemented, with the Facility Scheduling Dashboard posted on the NHERI website.
  - Consensus-based policies and procedures for NHERI completed and posted on the NHERI website.
  - Software Development and Lifecycle Management Plan updated.
- *By end of year one,*
  - Completion of the five-year *NHERI Science Plan* and posted on the NHERI website.
  - Completion of the User Forum community user satisfaction survey.
  - Organization of the REU site program and Summer Institute, for implementation in year one or two.
  - Evidence of several strategic key partnerships in process and/or implemented.

E. Computational Modeling and Simulation Center (SimCenter) Component - Additional Awardee Requirements, Responsibilities, and Key Year-One Milestones

Note: Proposals submitted to this solicitation for the SimCenter component must address these SimCenter Component - Additional Awardee Requirements, Responsibilities, and Key Year-One Milestones.

NSF's vision for cyberinfrastructure in Reference 8 (Section IX) identifies advancing new computational infrastructure as a priority for driving innovation in science and engineering. Software is an integral enabler of theory, computation, experimentation, and data-enabled science and engineering, and a central component of the new computational infrastructure. The SimCenter will serve as the leader and community resource within NHERI to provide new high quality, community-prioritized, online computational modeling and simulation tools to advance the NHERI vision outlined in Section II.A and the five-year NHERI Science Plan. These tools should address the natural hazards engineering community's computational needs identified in References 2-6 (Section IX) and obtained through ongoing requirements gathering with all stakeholders. The SimCenter investment should produce robust, reliable, usable, and sustainable software critical for potentially transforming the conduct and productivity of natural hazards engineering research, education, and innovation. The SimCenter proposal should present a compelling scientific case for its need and scope within NHERI, and the anticipated broader, societal impact of its computational modeling and simulation tools within the natural hazards engineering community. Through its performance metrics, the SimCenter will capture data, both qualitative and quantitative, describing how the SimCenter is meeting its stated goals, the quality and extent of use of SimCenter software tools, the impact on natural hazards engineering research and education, how the SimCenter has enabled new science and broader impacts, the impact on next generation workforce training and broadening participation, and extent of engagement of users and the natural hazards engineering community in all its activities. All SimCenter activities must proactively incorporate and demonstrate inclusiveness of groups underrepresented in STEM.

The award for the SimCenter will only support development of new computational modeling and simulation tools. This award will not support the maintenance, further development, enhancement, and user support of existing software. The SimCenter's software tools will be delivered to and implemented on the CI Awardee's software service delivery platform, using interfaces to be specified by the CI Awardee (see Section II.G). The SimCenter and CI Awardees will work cooperatively together to make the SimCenter software tools productive and supportive for the user community. All software tools developed should be open source and compatible with computing resources made available by the CI Awardee.

The SimCenter is responsible for development, user support, outreach, training, documentation, and usability studies for all its software tools. During year one, the SimCenter should focus on development and implementation of only a few selected computational modeling and simulation tools, with companion educational modules and case studies, to demonstrate and refine its software development and lifecycle management plan and its interface with the CI Awardee's software service delivery platform, while it works with the community to gather requirements and priorities for computational modeling and simulation tools to be developed in years two through five.

The SimCenter's core software staff is responsible for executing the software development and lifecycle management of each software tool to ensure a consistent and production-quality implementation on the CI Awardee's software service delivery platform. For each software tool development, the SimCenter staff should collaborate closely with a working group of core internal as well as core external domain experts, who are all financially supported by the SimCenter, to provide user input and pseudo code during the development process. To provide sufficient level of effort to enable on-time completion of software tools, the core internal and external domain experts should be supported for at least one month annually. After the SimCenter award is made, the working group may be expanded to include unfunded collaborators, as appropriate for the software tool. The domain experts should be selected through a transparent, equitable, and inclusive community process and include an appropriate mix of expertise required for the task, from areas such as earthquake, wind, and other engineering fields, computer science, information science, visualization, materials science, architecture, mathematical sciences, and social, behavioral and economic sciences.

The SimCenter Awardee should leverage existing cyberinfrastructure, software infrastructure, knowledge management and workflow productivity tools, and computing resources to enable this component to focus its primary effort and budget on the development of new computational modeling and simulation tools specifically for the natural hazards engineering community. The SimCenter Awardee will deliver a portfolio of online tools that reflects a balance of new capabilities for earthquake engineering research, wind engineering research, and multi-hazards engineering research. Examples of tools that might be developed include, but are not limited to, the following:

- Multi-scale, multi-physics, mechanics-based computational modeling capabilities for civil infrastructure components and systems that will reduce the reliance on physical testing to characterize the impact of natural hazards on new designs and materials;
- Validated, computational fluid dynamics software tools for wind engineering applications;
- Complex, multi-scale, multi-physics simulations of the impact of a natural hazard event on an urban city or region, integrated with visualization and decision-making tools;
- Tools to synthesize data from multiple media, e.g., digital, imaging, video, and/or remote sensing, to understand the impact of a natural hazard event on civil infrastructure and communities; and
- Civil infrastructure lifecycle assessment tools.

Requirements

Staffing (in addition to Section II.C): The SimCenter leadership, management, and core software staff should be located at the lead institution. The SimCenter Director (SimCenter Awardee PI), in addition to the requirements in Section II.C, should have prior accomplishments in software development. The leadership, management, and core software staff, including the composition of the PI and co-PI team, should reflect a balance of senior-level expertise and prior accomplishments in the domain science (earthquake engineering and wind engineering); software development, project management, implementation, and sustainability; on-time software delivery; best practices; validation and verification; user manuals and software documentation; on-line educational software tools; usability; and user training and support. The SimCenter staff should also demonstrate knowledge of recent advances and emerging technologies in cyberinfrastructure, software infrastructure, and computing resources.

Responsibilities

1. *Annual State-of-the-Art Analysis Report,* which positions the Awardee's Science and Strategic Plans and annual work plans for the SimCenter as a clear departure from the state-of-the-art so that it will not just be an incremental improvement over or duplicative of other NSF and Federally supported and existing software;
2. *Requirements Traceability Matrix,* obtained through a formal process to capture community buy-in, needs, priorities, and user requirements, which informs the selection of computational modeling and simulation tools developed, and is published on the NHERI website;
3. *Process for the Selection of the Computational Modeling and Simulation Tools to be developed in the context of the Requirements Traceability Matrix.* The process must include the following: compelling scientific justification for each software tool, and how the tool will advance research capabilities; an analysis of how the software tool compares to existing software tools and the limitations of these existing software; assessment and mitigation of the risks during software development and lifecycle support; expertise required and available for developing and maintaining the tool; cost-effectiveness of the budget required to develop, implement, and maintain the tool and provide user training and support; estimated user base and the basis for that estimate; and expected impact of the tool on natural hazards engineering research and education;
4. *Process for Selection of Each Computational Modeling and Simulation Tool Development Team (SimCenter core software staff and internal and external domain experts).* There must be a transparent, equitable, and inclusive community process for selecting domain experts to work with the SimCenter's core software staff on software tool development and implementation;
5. *Process for Selection and Application of Existing Knowledge Management and Workflow Productivity Tools,* to be incorporated/adapted into SimCenter tools;
6. *Tool-Specific Software Development and Lifecycle Management Plan,* for each software tool to be developed, including research software, educational modules, and case studies. The plan should follow the SimCenter's software development and lifecycle management plan; detail the basis of the cost estimate for the software tool over its lifecycle; identify the team members, their expertise, and each member's role and responsibilities; define deliverables for each tool; and outline the interface with the CI Awardee and its software service delivery platform;
7. *Process for Training Internal and External Domain Expert Team Members,* to ensure compliance with the SimCenter's Tool-Specific Software Development and Lifecycle Management Plan;
8. *High Quality and User-Tested Open Source Computational Modeling and Simulation Tools,* delivered to the CI Awardee's software service delivery platform, with complete metadata and documentation, for earthquake engineering, wind engineering, and multi-hazards engineering research, in accordance with the CI Awardee's interface, metadata, and software delivery system requirements;
9. *Educational Modules,* adapted from the SimCenter's computational modeling and simulation tools into open source, user friendly learning modules, with full user documentation and manuals, and evaluation and assessment tools, appropriate for undergraduate education;
10. *Published Case Studies,* developed with researchers and educators that use the SimCenter's software tools;
11. *Plan for Sustaining the SimCenter Software Tools,* during and beyond the award period;
12. *User Training and Support;*
13. *Annual Usability Study of Delivered Software Tools;* and
14. *ECO Program,* in addition to the responsibilities listed in Section II.C, to include:
    - Stakeholders and users actively involved in the SimCenter's activities through requirements gathering, research directions, training workshops, and updates on new advances and emerging technologies in cyberinfrastructure, computing resources, and software;
    - Virtual Communities of Practice that both contribute to and use the SimCenter's tools;
    - Research Traineeship Program for graduate students around the SimCenter's activities to develop the skills, knowledge and competencies to pursue a career in natural hazards engineering research and related fields; and
    - Monthly and Annual Community Reports, which informs the natural hazards engineering community of research and education

software tools under development and recently released, training activities, and use case studies, posted on the NHERI website.

Key Year-One Milestones

- *By end of third month of award,* Software Development and Lifecycle Management Plan updated.
- *By end of ninth month of award,*
  - An updated Requirements Traceability Matrix, which informs the year-two work plan.
  - Graduate Student Research Traineeship Program implemented.
  - Virtual Communities of Practice organized and implemented.
- *By end of year one,*
  - Evidence of computational modeling and simulation tools, education modules, and case studies developed, with associated user documentation, and delivered to the CI Awardee's software service delivery platform, user-tested, and being used by an initial, identified cohort of users.
  - Usability study completed for all computational modeling and simulation tools and education modules implemented during year one.

F. RAPID Facility Component (part of the Experimental Facility component) - Additional Awardee Requirements, Responsibilities, and Key Milestones

Note: Proposals submitted to this solicitation for the RAPID Facility component must address these RAPID Facility Component - Additional Awardee Requirements, Responsibilities, and Key Milestones.

The RAPID Facility is considered part of the Experimental Facility (EF) component cohort. For decades, NSF has supported researchers to gather perishable research data immediately following a natural hazard event in the United States or abroad. These awards have collected perishable data on the impacts of an event on natural systems, constructed civil infrastructure, social and economic processes, and response and recovery. These data have been used in subsequent research to advance knowledge for improving preparedness, mitigation, emergency response, and recovery strategies. The RAPID Facility will provide resources (such as equipment, instrumentation, and data management infrastructure) for quick field deployment globally to support perishable research data collection following an earthquake or windstorm event. The primary users of the RAPID Facility resources will be researchers supported through separate NSF awards for post-disaster investigations, with assistance in the field from RAPID Facility staff, as required. While the primary focus of this facility must be for perishable data collection following earthquake and windstorm events, this does not preclude facility resources being deployed for perishable data collection following other natural hazard events. All collected data must be curated and archived in the NHERI data repository.

This facility must be designed to meet the requirements and responsibilities for all Awardees in Section II.C and the RAPID Facility in this section. The RAPID Facility will work closely with: (a) the CI Awardee to develop and implement a facility data management plan to accommodate RAPID Facility data in the NHERI data repository, (b) the NCO Facility Scheduler for scheduling use of facility resources, and (c) the natural hazards community to develop and make this facility operational by the end of the second year of the award. The facility will actively engage the natural hazards community in meetings and workshops during year one to develop the concept for this facility, including requirements for equipment, instrumentation, and data management; user support and training programs; field logistics and safety; roles and responsibilities of users vs. facility staff; and manuals, policies, and procedures for accessing and using facility resources. The RAPID Facility Director will convene an External Steering Committee, with membership independent from institution(s) involved in the facility, during years one and two to provide independent oversight advice and guidance during facility development. The facility will annually provide evidence of an active, external, and broadly inclusive user base beyond researchers and educators located at the Awardee institution. To enable an orderly award closure period, use of facility resources will be completed by the facility at least two months prior to the original expiration date of the cooperative agreement.

This solicitation will not support the following for RAPID Facility proposals; proposals that request the following will be returned without review:

- Post-fire perishable data collection;
- Equipment and instrumentation that do not support perishable data collection following an earthquake or windstorm event;
- Major equipment refurbishments and upgrades, capital improvements to existing laboratory buildings and space, and construction of new buildings;
- A distributed facility, with resources owned, housed, and/or maintained by multiple organizations;
- A facility with any resources that can only be accessed or used outside the United States; and
- A facility for long-term instrumented structures and/or field sites.

Requirements

1. *Location:* All facility's resources and staff must be housed within the United States at the lead institution in order to efficiently manage, staff, and maintain the facility. Facility resources may be operated outside the United States for short-term periods to support perishable data collection. If the facility is part of a larger institutional laboratory complex and its associated budget and accounting, then its personnel effort, resources, and budget under the NHERI award are to be accounted for and tracked separately from the larger laboratory administration. (Exception: Shared-use instrumentation acquired post-award as the result of an annual Council work plan may be housed and maintained by one EF Awardee on behalf of the network.)
2. *Staffing (in addition to Section II.C):* The RAPID Facility Director (PI) also should have demonstrated expertise in facility operations, earthquake and/or windstorm rapid response research investigations, and use of information technology, and should be the main point of contact for users. The facility should have sufficient staff and technical expertise to support all Awardee requirements and responsibilities in Section II.C and this section, including a staff member to assist with scheduling with the NCO's Facility Scheduler. The staff must include a designated safety officer and an information technology (IT) specialist to support data management, telepresence (as appropriate), and cybersecurity.
3. *Facility Resource Allocations for NSF-supported Awards:* The facility will proactively market its resources and capabilities to lead to significant annual facility resource use by NSF awards, to justify its role and continued NSF support as a national, multi-user RAPID Facility. Sufficient time must be allocated annually for each facility resource to accommodate NSF-supported awards, user training, and participation in the NCO's REU site and Summer Institute programs. Priority for facility use must be given to separately supported NSF awards for post-disaster, perishable data collection.
4. *Facility Resource Scheduling:* The facility will delegate scheduling of facility resources to the NCO Facility Scheduler, with the RAPID Facility scheduler providing input into the scheduling process.
5. *User Fees/Recharge Rates*: The facility will maintain institutionally-established user fees/recharge rates during the entire award period for the resources and services that will be available to users.
6. *Annual Institutional Laboratory Inspection for EH&S,* with corrective actions promptly taken.
7. *External Steering Committee:* The membership will be external to the institution(s) involved in the facility. The facility will budget for all costs to support this committee, including travel costs.

Responsibilities

1. *Field Deployment Resources and Staff:* Provide, manage, and maintain facility resources to support post-disaster, rapid response research perishable data collection. This includes provision of fully functioning and calibrated equipment and instrumentation; a data management infrastructure; telepresence; remote equipment operations (as applicable for the equipment); Internet and Internet2

connectivity; equipment for EH&S protection; transport equipment; software integral to data collection; services and tools necessary for field deployment; and user support and services. There should be sufficient resources for users to conduct their field work and training safely and efficiently. Facility resources should be configured for deployment either by facility staff, who assist research teams, or independently by trained research teams. The facility is responsible for housing resources at the lead institution with appropriate security and cybersecurity. The facility will maintain an EH&S compliant facility. The facility will be responsible for insurance and indemnification;

2. *Plan for Management, Maintenance and Calibration of all Facility Resources,* prior to, during, and after each field deployment, as part of the NSF-supported budget;

3. *Facility Policies, Standard Procedures, and Protocols,* for the community to quickly access and deploy facility resources. The facility must clearly document, on the NHERI website, for potential users the roles and responsibilities of facility staff vs. research teams in deploying resources; the procedures, protocols, and logistics for resource access and deployment; and costs to be assigned to the facility vs. users for resource and facility staff deployment. The requested budget for the facility must include support for its staff to deploy with research teams, as needed. Research teams will be responsible for their own travel logistics and costs. Users not supported by NSF will be expected to pay institutionally-established user fees/recharge rates to access facility resources;

4. *Data Management Infrastructure:* Implement a facility data management plan*,* which meets the CI Awardee requirements for data and metadata protocols and formats, archiving, curating, and retrieval. There must be tools, established processes, and protocols to quickly upload field data to the NHERI data repository. The data management plan should be supported through cyberinfrastructure and cybersecurity compliant with institutional and CI Awardee policies;

5. *Facility Financial Operating Plan*, which is the annual financial plan for operating the facility showing sufficiency of resources and staffing through costs assigned to the NSF NHERI award and costs to be recovered from users through institutionally-established user fees/recharge rates; and

6. *User Support*, to include:
    - Identified staff for user support;
    - User training and support, with at least semi-annual on-site and online training workshops. User training should include user and safety manuals for the resources and a best practices manual for how to conduct post-disaster, rapid response research perishable data collection;
    - On-site user support during all phases, such as information needed for proposal writing, planning, deployment, and data collection and processing, and office and meeting space; and
    - Information to the CI Awardee for posting on the NHERI website, but not limited to: (a) institutionally-established user fees/recharge rates associated with the facility, (b) itemized inventory of all facility resources and their capabilities, (c) data management information and requirements, (d) list of facility personnel and safety officer contact information, (e) facility location and map, (f) policies, procedures, and protocols for facility access and use, (g) facility user, safety, and best practices manuals, (h) synopsis of field work conducted using facility resources, and (j) user training workshop dates and resources.

7. *ECO Program*, in addition to the responsibilities listed in Section II.C, appropriate for the facility.

Key Milestones

- Within three months of award, External Steering Committee formed and held its first meeting.
- By end of fourth month of award,
    - Software Development and Lifecycle Management Plan updated.
- By end of sixth month of award,
    - Scheduling process implemented with the NCO.
    - Evidence of active two-way engagement with the community and the CI Awardee to refine the Science Plan and develop the data and resource requirements for this facility.
- By end of year one, completion of the following facility documents; these documents will undergo a merit review organized by NSF, and continued development of this facility in year two will be subject to NSF approval.
    - Updated Science Plan for this facility, which identifies key research questions that justifies the equipment procurement by the facility, with reference to resources that are currently available at other organizations or otherwise accessible through collaborations, partnerships, or cyberinfrastructure.
    - Requirements document for facility resources and data management infrastructure.
    - Updated plans for operations in accordance with Section II.C and this section of the solicitation, plus an acquisition, procurement, and commissioning plan for facility resources in year two.
    - Working with the CI Awardee, a data management plan (informed by the requirements document) to accommodate the facility's data archiving, storage and retrieval in the NHERI data repository, in a way that facilitates ease of archiving and use of the data by researchers and the general public.
- By end of year two,
    - All facility resources procured, commissioned, and operational.
    - RAPID Facility data accommodated as part of the NHERI data repository.
    - User fees/recharge rates established by the Awardee and posted on the NHERI website.
    - Initial cohort of researchers trained and deployment-ready.
    - Submission to NSF, from the Awardee's Authorized Organizational Representative, certification that the RAPID Facility is fully operational and in compliance with institutional EH&S policies.
    - Compliance with All Awardee and Rapid Facility Awardee requirements and responsibilities outlined in Section II of this solicitation.
- Beginning in year two, and in all subsequent years, evidence of frequent opportunities provided for community training on use of the facility resources so that there are trained researchers who can quickly deploy facility resources.

G. Cyberinfrastructure (CI) Component - Additional Awardee Requirements, Responsibilities, and Key Year-One Milestones

Note: This section is provided only for reference since the NCO, SimCenter, and RAPID Facility must all interact with the CI component. This solicitation is not receiving proposals for the CI component. Proposals submitted for the CI component will be returned without review.

Cyberinfrastructure underpins and integrates NHERI as a virtual organization and provides Awardees and users with resources and services for research, collaboration and knowledge sharing. It enables discovery, technology transfer, innovation, education, and community outreach. It can also bring additional resources to NHERI through leveraging and interoperability with other NSF and Federally supported cyberinfrastructure projects. The CI Awardee may propose to change the NHERI name/acronym to be consistent with an appropriate and available Internet domain name. If NSF accepts this new name/acronym, then at the pre-award stage, NSF will change the titles of all NHERI awards to begin with this new acronym.

The overall design and operations of the cyberinfrastructure should incorporate research and best practices in providing cyberinfrastructure for virtual organizations. In addition, the CI Awardee should seek additional NSF funding opportunities to expand/enhance the cyberinfrastructure beyond the support provided under the NHERI award. The cyberinfrastructure will not be static and should evolve as the community develops richer tools with increasing data volumes and computational requirements; therefore, operations should include a strategy to periodically refresh/upgrade the cyberinfrastructure through new releases.

The CI Awardee should utilize/adapt the incumbent's NEEShub cyberinfrastructure content (including data and education materials) currently available on the NEEShub platform at http://www.nees.org to the new cyberinfrastructure. These content, software, and tools must be integrated

into the Awardee's cyberinfrastructure in a way that does not preclude their sharing and future porting and use across other platforms. If transition to a different platform becomes necessary in the future, then the CI Awardee will be responsible for ensuring that all content, software, and tools are fully transitioned to that platform without requiring renegotiation of proprietary agreements.

The current NEEShub Project Warehouse is based on commercial database software and primarily contains earthquake engineering experimental data. The NHERI data repository should be resourced to curate and archive the following data: (1) earthquake engineering data in the NEEShub Project Warehouse, (2) experimental data from NSF-supported awards that tested under the incumbent's operations and are not yet archived and curated, (3) experimental data generated by awards under the NSF 13-544, George E. Brown, Jr. Network for Earthquake Engineering Simulation Research Planning Grants, and NSF 14-557, Decision Frameworks for Multi-Hazard Resilient and Sustainable Buildings, solicitations, (4) experimental data generated through use of NHERI resources, and (5) by the end of year two, the capacity to archive and curate the following: experimental data generated by earthquake and wind engineering research awards supported by NSF (whether or not NHERI resources are used), data collected from earthquake and windstorm event investigations using RAPID Facility resources, data collected under NSF-supported RAPID awards investigating earthquakes and windstorms, legacy data sets identified as high priority data by the earthquake and wind engineering research communities, and experimental data from global partners that are agreed upon by the CI Awardee in support of such partnerships.

Requirements

1. *Location:* To the maximum extent practical, the CI Awardee's role, requirements, responsibilities, resources, and services should be implemented by staff employed at the Awardee's institution.
2. *Staffing (additional):* The CI Director (CI Awardee PI) also should have prior accomplishments in cyberinfrastructure design, development, operations, and management for research communities. The leadership, management, and operations staff should have expertise and prior accomplishments in developing, deploying, operating, and maintaining cyberinfrastructure, including an open source, archival and curated data repository and a software service delivery platform, and be knowledgeable in earthquake and wind engineering research experimentation, computation, digital preservation, metadata and data. The staff should be skilled in software development, making software user friendly, and providing user training and support.

Responsibilities

1. *Design, Development, Operations, and Management of Cyberinfrastructure*, to include:
   - *Design Strategy*, which is driven by the user community's priorities and user requirements, lifecycle costs, state-of-the-art, best practices, and leveraging of existing resources;
   - *Requirements Traceability Matrix*, which captures community priorities and user requirements that informs the design; there should be strong scientific justification, responsiveness to community priorities and needs, and a "critical mass" user base for the resources and services provided;
   - *NHERI-wide Identity, Trust, and Cybersecurity* plan, protocols and systems, including ongoing cybersecurity checks for NHERI-wide resources, including the NCO, EF and SimCenter Awardee systems, which utilize existing institutional procedures. The CI Awardee will be a leader in supporting resource access in a federated identity setting mode, e.g., by joining the InCommons federation (http://www.incommonfederation.org/);
   - *System Architecture and Software Design Approach*, enabling a high speed, interactive cyberinfrastructure for the community;
   - *Interoperability,* where appropriate, with other cyberinfrastructure and software development projects;
   - *Leveraged Resources*, from NSF and other Federally supported cyberinfrastructure, software infrastructure, and campus and/or national high performance and distributed computing resources;
   - *Operations*, with 100% near up time and with staffing expertise appropriate for the full spectrum of resources and services provided;
   - *Maintenance*, including a timeline for releases of upgrades to maintain state-of-the-art resources and services for the user community based on the Requirements Traceability Matrix and performance assessment; and
   - *Cyberinfrastructure Performance Assessment*, analyzing user data from the cyberinfrastructure instrumentation, software tool forum, annual usability study, Governance feedback, and other collected data;
2. *Provision of Community-driven, Production-quality Cyberinfrastructure*, which serves as the natural hazards engineering research and education gateway, with the baseline to include:
   - *An Interactive NHERI Website*, which is the network's outward facing portal and the user community's definitive interface to all NHERI resources and services. The CI Awardee will provide the infrastructure and content management software for all Awardees to provide information and tools. This website will be the portal to resources such as the NHERI data repository; access to computing resources; software services delivery platform with a suite of research and educational software tools, including those developed by the SimCenter Awardee; collaboration tools; a community calendar of events; the NCO's Facility Scheduling Dashboard; and EF Awardee information requested below in Section II.G;
   - *Fully Operational, End-to-End Data Management Infrastructure*, which includes a state-of-the-art, open source, curated NHERI data repository; robust data management tools for curating, archiving, searching and retrieving data; metadata and data protocols and formats; and policies, procedures, and preservation for curating and archiving earthquake engineering and wind engineering experimental data and post-disaster, rapid response research data. The repository should be interoperable with external repositories identified by the community in the Requirements Traceability Matrix. The CI Awardee will work with the EF Awardees to deliver tools that allow automatic upload of metadata and data to the repository and curation at the source during experimentation, as feasible;
   - *Software Service Delivery Platform*, for the SimCenter and other Awardees and users to deliver research and educational software tools for publishing and use on the cyberinfrastructure, through published interfaces and specifications for minimum quality and functionality requirements for software acceptance to the platform. The CI Awardee will develop and use a metadata standard for the software tools so that they can be managed within the cyberinfrastructure framework;
   - *Computational Modeling, Simulation, Visualization, and Educational Tools*, delivered for community use through the software service delivery platform. The CI Awardee will make these tools executable and user friendly on the software service delivery platform. The CI awardee will provide user support for the use of the tools on the platform, but the developer for the software tool will be responsible for separately providing technical user support through their own funding. The CI Awardee will deliver and support execution on the delivery platform the following software tools:
     - Incumbent's tools and educational materials on the NEEShub; the cost of transfer of these materials to the new platform will be the CI Awardee's responsibility;
     - Tools developed by the SimCenter Awardee;
     - Existing tools identified by users as critical for natural hazards engineering research and education;
     - New research and educational tools developed by external users; and
     - Experimental testing tools of broad user interest;
   - *Access to User Required Computing Resources*, through facilitated access to and use of campus and/or national high performance and distributed computing resources;
   - *Software Tool Forum*, through a platform for vetting the quality of software tools and educational resources and posting user case studies/examples of implementation;
   - *Knowledge Management and Workflow Tools*, to improve users' research productivity;
   - *Posted Case Studies of Data Reuse*;
   - *Collaborative and Videoconferencing Tools*, for Awardees, Governance, and Users;
   - *Cyberinfrastructure Instrumentation*, for collecting data on web, software tool, and resource usage; and

User Support, for all aspects of the cyberinfrastructure, including user training, manuals, and tickets;
3. *Annual State-of-the-Art Analysis Report*, which summarizes recent advances and new technologies in the field for cyberinfrastructure and presents cost/benefit analyses for status quo or planned upgrades, mapped to ongoing user requirements;
4. *Annual Usability Study* of the cyberinfrastructure, including the NHERI website, data management infrastructure, and software service delivery platform, and use of the results for continuous improvement; and
5. *ECO Program*, in addition to the responsibilities listed in Section II.C, to include:
    ○ Training programs for active and prospective users on all aspects of the cyberinfrastructure;
    ○ Organization of Virtual Communities of Practice that contribute to and use the software tools and data in the NHERI repository for research and education; and
    ○ Monthly and Annual Community Reports that inform users about new releases, software tools, data sets, and data management capabilities; resource usage data; and upcoming training workshops.

Key Year-One Milestones

- By end of first month of award, a meeting of the CI Awardee, incumbent and NSF will occur to begin the cyberinfrastructure transition process.
- By end of third month of award,
    ○ Software Development and Lifecycle Management Plan updated.
    ○ Initially published NHERI website, and content management software available to the other Awardees.
- By end of eighth month of award,
    ○ NHERI website/portal operational.
    ○ Software Service Delivery Platform operational.
    ○ Cybersecurity Plan completed and initial implementation across Awardees.
    ○ Requirements for curation and archiving of research data published on NHERI website.
    ○ Virtual Communities of Practice organized.
- By end of year one,
    ○ Operational end-to-end data management infrastructure, including the NHERI data repository.
    ○ Working with the RAPID Facility Awardee, a data management plan for the RAPID Facility as part of the NHERI data repository.

H. Experimental Facility Component, excluding the RAPID Facility - Additional Awardee Requirements, Responsibilities, and Key Year-One Milestones

Note: This section is provided only for reference since the NCO, SimCenter, and RAPID Facility will interface with other EF component awards. This solicitation is not receiving proposals for the EF component, with the exception of the RAPID Facility discussed in Section II.F. Proposals submitted for an EF component other than for a RAPID Facility will be returned without review.

This section outlines the additional Awardee requirements, responsibilities, and key milestones for all EF Awardees, with the exception of the RAPID Facility, which is described separately in Section II.F. An EF Awardee will provide the experimental resources, services, and capabilities for earthquake engineering research or wind engineering research to address the NHERI vision in Section II.A, operational goals in Section II.B, and its own Science Plan. Each EF Awardee will provide unique, technically advanced, major earthquake engineering research or wind engineering research experimental equipment and instrumentation that do not exist elsewhere in the United States at comparable scale and testing capability. As part of the NHERI portfolio, the EF Awardees collectively will demonstrate, at the national scale, unique, complementary, and synergistic experimental, cyberinfrastructure, and education and outreach capabilities. Each EF Awardee will annually provide evidence of an active, external, and broadly inclusive user base beyond researchers and educators located at the Awardee institution. To enable an orderly award closure period, all experimental testing and use of facility resources will be completed at the EF at least two months prior to the original expiration date of the cooperative agreement.

An EF proposed with an earthquake engineering research focus does not need to be limited to the 14 NEES experimental facilities supported under the incumbent's award. This solicitation will not support the following; proposals that request the following will be returned without review:

- Fire testing equipment and capabilities;
- Experimental capabilities that do not support earthquake engineering or wind engineering research;
- With the exception of the RAPID Facility, the establishment of a new laboratory, acquisition of new/replacement major experimental equipment, major equipment refurbishments and upgrades, capital improvements to existing laboratory buildings and space, and construction of new buildings;
- A distributed facility, with resources owned, housed, and/or maintained by multiple organizations;
- A facility with any equipment that can only be accessed or used outside the United States;
- A facility with the primary focus and capability for development of advanced experimental testing algorithms and techniques; and
- A facility for long-term instrumented structures and/or field sites.

Requirements

1. *Location:* The EF Awardee's experimental resources will be housed within the United States at a single academic institution. EF resources may be operated outside the United States for short-term periods to support research. If the EF is part of a larger institutional laboratory complex and its associated budget and accounting, then its personnel effort, resources, and budget under the NHERI award are to be accounted for and tracked separately from the larger laboratory administration. (Exception: Shared-use instrumentation acquired post-award as the result of an annual Council work plan may be housed and maintained by one EF Awardee on behalf of the network.)
2. *Staffing (additional):* The EF Director (EF Awardee PI) also should have expertise in facility operations and should be the main point of contact for users. The EF Awardee should have sufficient staff and technical expertise to support daily operations, maintenance and calibration, experimentation, scheduling with the NCO's Facility Scheduling Protocol, and users, and should include a designated safety officer and an information technology (IT) specialist to support data management, telepresence, and cybersecurity.
3. *EF Resource Allocations for NSF-supported Awards:* The Awardee will proactively market its resources and capabilities to lead to significant annual facility resource use by NSF-supported research and education awards, to justify its role and continued NSF support as a national, multi-user EF. Sufficient time will be allocated annually for each facility resource to accommodate NSF-supported awards, user training, and participation in the NCO's REU site and Summer Institute programs.
4. *Facility Resource Scheduling:* The EF Awardee will delegate daily scheduling of facility resources to the NCO Facility Scheduling Protocol, with the EF scheduler providing input into the scheduling process.
5. *User Fees/Recharge Rates:* The EF Awardee will maintain institutionally-established user fees/recharge rates during the entire award period for the resources and services that will be available to users.
6. *Annual Institutional Laboratory Inspection for EH&S,* with corrective actions promptly taken.

Responsibilities

1. *Experimental Resources:* Provide, manage, operate, and maintain fully functioning and calibrated experimental resources for earthquake engineering or wind engineering research, to include, as applicable for the EF: major experimental equipment; instrumentation; sensors; data management infrastructure; telepresence; remote equipment operations (as applicable for the equipment); Internet and Internet2

connectivity; equipment for EH&S protection; specimen handling and transport equipment; specimen construction, staging, and demolition areas; software integral to testing; and other services and tools necessary for experimentation. There should be sufficient resources for users to conduct their experimental work and training safely and efficiently. Each EF Awardee is responsible for physical laboratory equipment security and cybersecurity. Each EF Awardee will maintain an EH&S compliant facility. Each EF Awardee will be responsible for insurance and indemnification;

2. *Standard Experimental Protocols:* Provide standard experimental protocols, so that users can efficiently write proposals for using facility resources and efficiently plan and conduct experiments;

3. *Data Management Infrastructure:* Implement an end-to-end data management plan for the facility, which meets the CI Awardee requirements for data and metadata protocols and formats, archiving, curating, retrieval, automatic upload of data during experimentation to the NHERI data repository or process for upload of validated field data, data curation at the source as feasible, and cybersecurity. The data management plan and EF use should be supported through cyberinfrastructure and cybersecurity compliant with institutional and CI Awardee policies;

4. *Facility Financial Operating Plan,* which is the annual financial plan for operating the EF showing sufficiency of resources and staffing through costs assigned to the NSF NHERI award and costs to be recovered from users through institutionally-established user fees/recharge rates; and

5. *User Support,* to include:
   - Identified staff for user support;
   - User training and support, with at least one annual on-site training workshop;
   - On-site user support during all phases, such as information needed for proposal writing, planning, specimen construction, experimentation, specimen removal/demolition, and data processing, and office and meeting space; and
   - Information to the CI Awardee for posting on the NHERI website, but not limited to: (a) institutionally-established user fees/recharge rates associated with testing at the EF, (b) an itemized inventory of all EF resources, capabilities, and testing algorithms, (c) standard experimental protocols, (d) list of EF personnel and safety officer contact information, (e) EF location and map, (f) procedures for EF access and use, (g) EF user and safety manuals, (h) data management information and requirements, (i) recent research projects conducted at the EF, and (j) user training workshop dates and resources.

Key Year-One Milestones

- By end of second week of award,
  - Submission to the NSF, from each EF Awardee's Authorized Organizational Representative, certification that on the start date of the award, all facility resources listed in the proposal are fully operational and the facility is in compliance with institutional EH&S policies, and complete list of the institutionally-established user fees/recharge rates for the EF.
- By end of fourth month of award,
  - Software Development and Lifecycle Management Plan updated.
  - Complete user support information provided to the CI awardee for the NHERI website.
- By end of sixth month of award,
  - EF scheduling implemented with the NCO.

III. AWARD INFORMATION

The anticipated funding amount of $19,100,000 is the estimated total for up to five years for up to three awards (three Awardees). The table below shows the anticipated annual base budget support for each Awardee, contingent upon the annual budgets of NSF, the annual performance of the Awardee, and the extent of utilization of Awardee resources by NSF-supported research and education awards. For the RAPID Facility Awardee, a one-time budget increase of up to $1,200,000 in year two will be available for new equipment acquisition and commissioning, contingent upon the outcome of the year one merit review and NSF approval.

Additional support, either through an increase in the base budget or as a supplement, may be provided as follows, contingent upon annual appropriations for NSF and NSF approval:

- For all Awardees, as appropriate, to support annual Council work plan activities.
- For the RAPID Facility, to repair damaged equipment, based on the Special Award Conditions listed in Section VII.B, Award Conditions.

Anticipated Annual Support					
Awardee	Year One	Year Two	Year Three	Year Four	Year Five
Network Coordination Office award base budget	$700,000	$900,000	$900,000	$900,000	$700,000
Computational Modeling and Simulation Center award base budget	$2,000,000	$2,200,000	$2,300,000	$2,200,000	$2,200,000
Post-Disaster, Rapid Response Research Facility award base budget	$500,000	$1,800,000	$600,000	$600,000	$600,000

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.

Who May Serve as PI:

The PI must be a full-time employee of the lead institution by the start date of the NSF cooperative agreement award.

Limit on Number of Proposals per Organization: 2

An academic institution may submit up to two proposals as the lead institution, but may not submit more than one proposal as the lead institution in any one of the following three proposal categories:

1. Network Coordination Office (NCO),
2. Computational Modeling and Simulation Center (SimCenter), and
3. Post-Disaster, Rapid Response Research (RAPID) Facility.

A full proposal involving more than one organization must be submitted as a single administrative package from the lead institution; collaborative full proposals with multiple administrative packages will not be accepted and will be returned without review. If the Principal Investigator of a full proposal leaves or transfers to another institution during the review process or after an award is made, the proposal/award remains with the lead institution. Additionally, the lead institution cannot be changed after submission of the full proposal. National laboratories and private sector companies, as well as non-U.S. institutions, may participate in NHERI award activities using their own resources and cannot receive NSF support from an award made under this solicitation; however, this shall not be interpreted to prohibit purchases, services, or sales contracts/agreements with these entities. A proposal for the RAPID Facility must have all facility resources owned, operated, and maintained by the lead institution and located within the United States to facilitate access by NSF-supported users.

Limit on Number of Proposals per PI or Co-PI: 1

An individual may appear as Principal Investigator (PI) or co-PI in no more than one full proposal. Applicants are responsible for ensuring that no individual is listed as PI or co-PI in more than one proposal. If an individual is included as PI or co-PI in two or more proposals submitted by the full proposal deadline, then the first proposal submitted, based on the FastLane system time stamp, will be deemed the one allowable submission. All subsequent proposals that include the individual as PI or co-PI will be returned without review.

Furthermore, a PI or co-PI may serve as PI or co-PI on only one award made under NSF 14-605 and this solicitation, i.e., a PI or co-PI named on an award made under NSF 14-605

may not serve as a PI or co-PI on an award made under this solicitation. A proposal submitted to this solicitation with a PI or co-PI named on the NSF proposal cover sheet who receives an award under NSF 14-605 will be returned without review. NSF will not allow substitutions of PIs and co-PIs on proposals and/or subsequent awards to circumvent this requirement.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent *(required):*

A Letter of Intent (LOI) must be submitted by the Sponsored Projects Office (SPO) of the submitting institution by the LOI due date. Proposals received for this competition that are not preceded by a LOI from the SPO of the submitting institution will be returned without review.

Include the following information: (a) name of lead institution, (b) names of participating organizations, and (c) names and organizational affiliations of the PI and co-PIs (included under Other Senior Project Personnel), Leadership and Management Team, and Additional Project Personnel. Also include the following information, as appropriate:

- For a Network Coordination Office proposal, describe the network coordination office strategy and major activities.
- For a Computational Modeling and Simulation Center proposal, describe the types of research and educational software tools to be developed.
- For a RAPID Facility proposal, describe preliminary concepts for facility resources and capabilities to be provided.

For additional information regarding LOI submission please see the Grant Proposal Guide (GPG Chapter I.D.1).

After submission of the LOI, the lead institution cannot change, as a full proposal may be submitted only by a lead institution that has submitted a complete LOI by the LOI due date. With the exception of the lead institution, all other participants listed on a submitted LOI may be changed at any time prior to the full proposal submission deadline, and these changes do not require notification to NSF. NSF will use the LOI only to prepare for the proposal merit review process.

Letter of Intent Preparation Instructions:

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- Sponsored Projects Office (SPO) Submission is required when submitting Letters of Intent
- A Minimum of 0 and Maximum of 4 Other Senior Project Personnel are allowed
- A Minimum of 0 and Maximum of 30 Other Participating Organizations are allowed
- Leadership and Management Team (name, organizational affiliation) is required when submitting Letters of Intent
- Additional Project Personnel (name, organizational affiliation) is required when submitting Letters of Intent
- Submission of multiple Letters of Intent is not allowed

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf). To obtain copies of the Application Guide and

Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

Important Proposal Preparation Information: FastLane will check for required sections of the proposal, in accordance with *Grant Proposal Guide* (GPG) instructions described in Chapter II.C.2. The GPG requires submission of: Project Summary; Project Description; References Cited; Biographical Sketch(es); Budget; Budget Justification; Current and Pending Support; Facilities, Equipment & Other Resources; Data Management Plan; and Postdoctoral Mentoring Plan, if applicable. If a required section is missing, **FastLane will not accept the proposal.**

Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions. If the solicitation instructions do not require a GPG-required section to be included in the proposal, insert text or upload a document in that section of the proposal that states, "Not Applicable for this Program Solicitation." Doing so will enable FastLane to accept your proposal.

A full proposal may be submitted only by a lead institution that has submitted a complete LOI by the LOI due date. A full proposal submitted from an organization that has not submitted a LOI by the due date will be **returned without review**. Due to the complexity of the proposals being submitted, use of FastLane to prepare and submit the full proposal is strongly encouraged.

The full proposal must conform to the guidelines specified in the NSF Grant Proposal Guide (GPG) or the NSF Grants.gov Application Guide (as discussed above), and the additional full proposal preparation instructions below, which include deviations from the NSF GPG and the NSF Grants.gov Application Guide as follows;

- The Project Description must not exceed 55 pages, inclusive of Sections 1-17.
- Additional information is specified for inclusion in the Facilities, Equipment, and Other Resources section.
- Additional information is specified for inclusion in the Special Information and Supplementary Documentation section.
- Additional Single Copy Documents must be provided.
- Names of unfunded collaborators (individuals and organizations) must not be identified **anywhere** in the proposal. The accountability for the success of the proposed component resides with the team proposed who are requesting financial support, rather than in a list of unfunded collaborators who might contribute to the project, but have no formal accountability for completion of work or deliverables. The proposed and budgeted team must be able to demonstrate on its own merit that it is well-qualified to undertake the proposed activities. NSF assumes that after the award is made, the Awardee will be able to assemble a technically-qualified and interested team of unfunded collaborators, as needed, to serve in various capacities in support of its goals and activities.

A full proposal that is not compliant with the GPG or the NSF Grants.gov Application Guide and the additional full proposal preparation instructions in this section will be returned without review. Appendix X of this solicitation provides a full proposal compliance checklist.

COVER SHEET

- Start Date: March 1, 2016 (estimated)
- Title of Proposed Project: NHERI Network Coordination Office, NHERI Computational Modeling and Simulation Center, or NHERI RAPID Facility
- NSF Organization Unit: CMMI - Natural Hazards Engineering Research Infrastructure (NHERI)
- Fund Code: 013Y

PROJECT DESCRIPTION

General Project Description Preparation Instructions

- Tables and lists in the Project Description may be in a smaller type but proposers are responsible for ensuring that the type is readable when the page is printed.
- Proposers should refer back to Section II, Program Description, to help guide their proposal preparation.
- Proposals may describe the processes for establishing Awardee-specific committees in the proposal that are comprised primarily of membership external to the proposal team and participating institution(s), but proposals must not include names and organizational affiliations of any committee/advisory board members and committee/advisory board chairs unless they are individuals who are explicitly budgeted to receive financial salary support of at least one month annually in the NSF budget request and included as such in the budget justification (this includes personnel at the lead institution, subawards, and consultants). Proposals not compliant with this requirement will be **returned without review**.
- The Project Description section of the full proposal must contain the information specified below, in the order listed, using the section numbering and headings shown below. The page limit shown for each section is only a guide for that section. Proposals may deviate from the section page limits, but the total number of pages in the Project Description must not exceed 55 pages.

Section 1. Summary Tables (*all proposals, up to five pages*)

At the start of the Project Description, provide the following two tables. Do not include any introductory sentences or paragraphs preceding these tables.

- Table 1, "List of Participating Organizations," listing all organizations participating in the proposal (including consultant organizations) requesting support. Use the following column headings: name of organization, location (city, state, and country only if not in the U.S.), Internet domain name (e.g., abcxyz.edu), year-one requested support, and cumulative (five-year) requested support.
- Table 2, "List of Project Personnel," listing all project personnel who request support in the NSF budget, i.e., with the minimum amount of support of one month annually, whether at the lead institution or at a partner organization. Use the following column headings: full name (last, first), professional title, organizational (and departmental, where applicable) affiliation, organizational Internet domain name (e.g., abcxyz.edu), project position title, year-one level of effort (number of months, e.g., two months), cumulative (five-year) level of effort, and up to a three-sentence description of the responsibilities of each individual. In the description of the responsibilities, include if the position is a leadership or management position. All leadership and management positions must have individuals named. For other positions, if the name of an individual is not known at the time of proposal submission, enter "To Be Determined" in the table and the date when that position will be filled.

Section 2. Intellectual Merit and Broader Impacts of the Proposed Work (all proposals, up to two pages)

Include a subsection 2.A, with the heading "Intellectual Merit," and a subsection 2.B, with the heading "Broader Impacts of the Proposed Work." In subsections 2.A and 2.B, highlight the Intellectual Merit and Broader Impacts, respectively, of the proposed work for advancing natural hazards engineering research, education, knowledge, and innovation, and the mechanisms, including performance metrics, which will be used to measure and assess success.

Section 3. Results from Prior NSF Support (all proposals, up to five pages)

Prepare this section for each PI and co-PI named on the NSF cover sheet in accordance with NSF 15-1 GPG, Section II.C.2.d.iii.

Section 4. Science Plan *(all proposals, up to four pages)*

Section 5. Strategic Plan for Operations, including Performance Metrics *(all proposals, up to five pages)*

Include targets for each performance metric.

Section 6. Marketing and Broadening Participation Plan for Developing the User Base *(all proposals, one page)*

Describe the plan for marketing and outreach that will be conducted to develop a strong user base for the resources and services provided, how that user base was determined, and the basis of estimate for that user base. Describe specific outreach that will be conducted to broaden the user base to be inclusive of groups, institutions, and geographic regions underrepresented in STEM.

Section 7. Organizational Structure, Staffing, and Diversity *(all proposals, up to two pages).*

Present an organizational chart that shows the following: full first and last names for each individual, organizational affiliation and organizational title, position title/role within the proposed project, lines of authority, and year-one full-time equivalent (FTE) person-month effort (e.g., two months) for those included in Table 2. Identify leadership and management positions. Indicate existing personnel and personnel to be hired post-award. Show the reporting lines to internal offices at the lead institution responsible for award oversight and lines of interactions with the other NHERI Awardees, Governance, Users, and broader natural hazards engineering community. Describe why this structure and the project team's qualifications will be effective for leading, managing, and implementing the project. Discuss the plan for developing staffing inclusive of groups underrepresented in STEM.

Section 8. Project Management and Performance Assessment *(all proposals, up to three pages)*

Describe how the lead institution will implement project management and performance assessment, including oversight of subawards/subcontracts. Highlight five key performance metrics from Section 5 above that will be used to measure and asses the value added of this component for advancing natural hazards engineering knowledge and innovation. For the PI and co-PIs on the proposal that have had prior NSF support during the past five years as part of a large facility, cyberinfrastructure, software development, or center/institute award with an annual average award budget of $500,000 or greater, cite each NSF award number, title, duration and award amount and provide a summary of the lessons learned from these award(s) that inform(s) the proposed project management and performance assessment strategy.

Section 9. Work Breakdown Structure (WBS) and Budget Allocations (*all proposals, up to two pages*)

Present the WBS to level 3 (i.e., 1.2.3) for the entire five-year scope and the associated budget for each WBS element. Using the WBS, provide the budget allocation for each element, rolling up the budget at each level. The budget allocation for each WBS element should be the total of the direct and indirect costs. The budget allocations must total to the cumulative, five-year FastLane request budget request. The WBS dictionary will be provided separately in the Special Information and Supplementary Documentation section.

Section 10. Governance Interactions (*all proposals, one page*)

Describe how the NHERI component will interact with the Governance structure. Describe up to three NHERI-wide policies and procedures, up to three committees, and up to three cross-Awardee activities that would be beneficial to the operations of the proposed component.

Section 11. Component-Specific Implementation *(all proposals, up to 12 pages)*

Network Coordination Office (NCO proposals only)

Describe how the NCO will be implemented to meet the requirements and responsibilities in Section II.D:

- Governance Support: Council, NIAC, User Forum, and Committees.
- Facility Scheduling: Describe the preliminary Facility Scheduling Protocol (included in the Supplementary Documentation and Special Information section) and facility scheduling software, and highlight interactions, timeline, roles, and responsibilities among the NCO, the EF Schedulers, and facility users. Provide a scenario for implementation of the Facility Scheduling Protocol and facility scheduling software. Illustrate the Facility Scheduling Dashboard to be implemented on the NHERI website.
- Annual Council Work Plan.
- Five-Year NHERI Science Plan.
- Strategic Experimental Facility Partnerships. Describe the strategy that will be used to identify key experimental facility partners. Names of partners must not be included in the proposal.
- Education and Community Outreach Program, including the REU site and the Summer Institute.
- Given the above information, the rationale for why this proposed component will effectively serve users as part of a national, multi-user facility.

Computational Modeling and Simulation Center (SimCenter proposals only)

Describe how the SimCenter will be implemented to meet the requirements and responsibilities in Sections II.E by providing the following information:

- State-of-the-art analysis, which positions the vision and activities for the SimCenter as a clear departure from the state-of-the art and a value added resource for natural hazards engineering research and education.
- Process for developing and updating the Requirements Traceability Matrix during the award period. A preliminary Requirements Traceability Matrix must be included in the Special Information and Supplementary Documentation proposal section.
- Process for selecting computational modeling and simulation tools to develop, with the process demonstrated for the selection of the year-one tools.
- Process for selecting software tool development teams, including internal and external domain experts, with the process demonstrated for the selection of the year-one teams.
- Process for selecting existing knowledge management and workflow productivity software tools to incorporate/adapt into SimCenter tools.
- Description of the year-one computational modeling and simulation software tools, educational modules, and case studies to be developed.
- An example Tool-Specific Software Development and Lifecycle Management Plan (using the plan provided below in Section 16) for the proposed tool with the largest budget allocation in year one. Provide a detailed cost breakdown for the budget for that tool, the expected user base, and how that user base was determined.
- Process for training internal and external domain expert team members.
- Plan for interface with the CI Awardee to deliver tools to the software service delivery platform, including all user manuals and documentation.
- Plan for assessing software tool quality, performance, and utilization.
- Plan for sustainability of SimCenter software tools during and after the award period.
- Description of user training and user support services to be provided.
- Plan for annual usability study of delivered software tools.

- Education and Community Outreach Program, including participation in the NCO's REU Site and Summer Institute.
- Given the above information, the rationale for why this proposed component will effectively serve users as part of a national, multi-user facility.

RAPID Facility (RAPID Facility proposals only)

Describe how the RAPID Facility will be implemented to meet the requirements and responsibilities in Section II.F. The RAPID Facility should describe its preliminary concepts and plans through the information requested below; this information will be updated during the year-one planning process.

Provide the following information:

- Evidence of post-disaster, rapid response research perishable data collections conducted by the proposal team and their roles in these investigations. Reference reports and data from these investigations in the public domain, describe how the data were used in subsequent research, and summarize the lessons learned from these investigations that inform the proposed facility.
- Location of the RAPID Facility headquarters, staff offices, and space available for equipment storage, maintenance and calibration, and data management.
- Plan for developing the facility during years one and two.
- Preliminary concepts for facility resources (equipment and instrumentation), services, and staffing to address the Science Plan's research questions.
- Preliminary concepts for the data management infrastructure and plan. Describe the end-to-end data management workflow that will be supported by the facility, and the roles and responsibilities of facility staff, facility users, and CI Awardee in each workflow step.
- A table that benchmarks preliminary concepts for equipment and instrumentation with comparable resources in the United States, and if applicable, globally.
- Plan for management, maintenance, and calibration of facility resources, and complying with EH&S requirements. Include the following: facility safety and security features and types of institutional laboratory inspections conducted, frequency of inspections, and how corrective actions are resolved.
- Preliminary concepts for facility policies, standard procedures, and protocols for the community to quickly access and deploy facility resources, including interface with the NCO Facility Scheduler. For a potential major earthquake or windstorm event in the U.S., discuss implementation of these policies, procedures, and protocols for a hypothetical NSF-supported research team (external to the facility staff) planning to use facility resources, including training, pre-deployment planning, equipment transport, in field services and support, and post-deployment data processing and management. Describe potential facility resources that would be used, timeline, data management workflow, and the associated services and user support from planning to completion of field deployment and data archiving in the NHERI data repository.
- Facility Financial Operating Plan, describing how facility operations costs might be assigned to the NHERI award and institutionally-established user fees/recharge rates. This discussion should address the Facility Financial Resource Operating Plan provided in the Facilities, Equipment, and Other Resources section of the proposal.
- User training and support services: pre-, during, and post-deployment. Describe the training and support services that will be provided that make this facility a national, multi-user facility for the natural hazards research community.
- Plan for how the facility will work with the NCO Facility Scheduling Protocol and Scheduler.
- Plan for annual facility resource availability for NSF-supported users. Describe any challenges in availability of the resources for use by separate NSF-supported awards.
- Education and Community Outreach Program, including participation in the NCO's REU Site and Summer Institute.
- Given the above information, the rationale for why this proposed facility will effectively serve users as part of a national, multi-user facility.

Section 12. Project Schedule *(all proposals, up to two pages)*

In table format, present the five-year schedule for major project activities, with milestones for initiation and completion of major deliverables. Include the key milestones listed in Section II for the proposed component.

Section 13. Year-One Work Plan *(all proposals, up to three pages)*

Provide a table with the following column headings: WBS element number and name, strategic goal, objective, brief activity description, activity budget (total direct and indirect costs) deliverable, milestone date, performance metric, performance metric target, and responsible organization/staff name(s). The total budget should total to the year-one NSF FastLane budget request.

Section 14. Cybersecurity Plan - Summary *(all proposals, up to one page)*

Section 15. Risk Management Strategy and Plan, including Risk Assessment Matrix *(all proposals, up to two pages)*

Include a risk assessment matrix and the strategy for mitigating each risk. Relevant to the resources to be provided, describe how the Awardee will be compliant with the International Traffic in Arms Regulations (ITAR) and Export Administration Regulations (EAR). If ITAR and EAR are not applicable, then indicate as such.

Section 16. Software Development and Lifecycle Management Plan *(all proposals, up to three pages)*

Section 17. Other Information *(optional for all proposals, up to two pages)*

Provide any additional information that the lead institution believes will be of assistance in evaluating the proposal but does not fit into any of the sections defined above or in the Facilities, Equipment, and Other Resources and Special Information and Supplementary Documentation sections.

FACILITIES, EQUIPMENT, AND OTHER RESOURCES

In this section of the proposal, include the descriptions below; however, the descriptions **must not** include any quantifiable financial information about the resources that will be made available as a NHERI resource. Also, as unfunded collaborators must not be identified anywhere in the proposal, do not include names of potential unfunded collaborators (individuals and organizations) in this section.

For all proposals:

- Description of the space and resources at the lead institution that will be made available for the project headquarters.
- Description of resources and services to be provided by the supported institution(s) that are not requesting support.

For RAPID Facility proposals only:

- One-page floor or site plan of the proposed facility, with dimensions, showing secured storage areas, work areas for equipment maintenance and calibration, perimeter security, and meeting and office space. If the facility is part of a larger laboratory space, clearly indicate the boundaries of the proposed facility on the plan.

- Up to eight photos of the proposed facility, not to exceed two pages, showing the resources to be provided. Annotate the photos as needed to define the laboratory/site space and highlight safety and security equipment and features.
- Facility network diagram, including Internet and Internet2 connectivity and capacity and data flow from source to NHERI data repository.
- Facility Financial Resource Operating Plan: Provide an Inventory Table, with the rows to be the "Facility Resources" itemized for proposed equipment and instrumentation resources, staff positions (e.g., laboratory technician), and other resources that will be available to users and the column to be "Source of Support" for each resource (indicate either "NHERI Award" or "Institutionally-Established User Fees/Recharge Rates"). Do not include quantifiable financial information in this table.

SPECIAL INFORMATION AND SUPPLEMENTARY DOCUMENTATION

This section must include the information requested below in Sections A through E, using the headings and page limits shown below, and must not include any other additional information. If a particular section is not applicable, include the section heading and write below "Not Applicable." Proposals must not include letters from project personnel requesting support in Tables 1 and 2. As unfunded collaborators must not to be identified anywhere in the proposal, do not include letters from potential unfunded collaborators (individuals and organizations) in this section.

A. Work Breakdown Structure (WBS) Dictionary *(all proposals, up to eight pages).*

Provide the WBS dictionary for each WBS element listed in the Project Description.

B. Roles and Responsibilities of all Project Positions Requesting Support *(all proposals, up to 20 pages)*

For each position (individual) who will receive financial support in the requested budget, provide the following information: project position title, requested annual financial support in project (e.g., two months), name (if known or enter TBD), position title in employer organization, name of employer organization, and up to a one-page description of the role and responsibilities of that project position/individual.

C. Biographical Sketches of Additional Project Personnel *(all proposals, if applicable, up to 10 additional project personnel; up to 20 pages; otherwise enter "Not Applicable").*

Two-page biographical sketches, following the NSF GPG format, for up to ten additional project personnel requesting support, may be included in this section; proposals must not include more than ten additional biosketches.

D. Preliminary Requirements Traceability Matrix *(SimCenter proposal only, up to 10 pages; all other proposals enter "Not Applicable").*

E. Preliminary Facility Scheduling Protocol *(NCO proposal only, up to 5 pages; all other proposals enter "Not Applicable").*

SINGLE COPY DOCUMENTS

Submit the "List of Participating Organizations" (Table 1 in the Project Description) and "List of Project Personnel" (Table 2 in the Project Description) together as a text-searchable single Portable Document Format (PDF) file in FastLane in the single copy section of the full proposal.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Proposers should prepare annual budgets in accordance with the roles, requirements, and responsibilities outlined in Section II, "Program Description," Section III, "Award Information," and the budgetary limitations below. Requested annual and total budgets must not exceed the budget amounts listed in Section III, "Award Information." For budgeting purposes, assume a start date of March 1, 2016.

All proposals

- To provide sufficient level of effort as part of a large, multi-user facility, each individual requesting financial support must be supported for at least one month annually during each year of planned participation on the project. (Note: An individual does not need to be supported during all five years of the project). Proposals that include individuals budgeted with less than one month salary support during any project year will be returned without review.
- The year one budget includes all start-up costs.
- Annual budgets should include travel for staff to participate in Governance meetings, REU site program, Summer Institute, one NSF-supported Large Facility Workshop, and one NSF-supported Cybersecurity Summit.
- Up to $10,000 should be budgeted annually to provide local staff support for the REU students at the project location.
- Up to $10,000 should be budgeted for local staff support to participate in the NHERI Summer Institute.
- Postdoctoral researchers may be supported only on the SimCenter award and must be U.S. citizens, U.S. nationals, or permanent residents of the United States.
- Graduate students who are U.S. citizens, U.S. nationals, or permanent residents of the United States may be supported in three ways: (a) to assist with local campus implementation of the REU site program, (b) as participants in the SimCenter Research Traineeship program, or (c) to support other Awardee activities, if approved in the annual work plan by the cognizant NSF Program Officer. Other graduate students may not be supported.
- Proposals may include participant support costs for specific activities identified in the proposal. Include a budget justification table showing the activity name, number of participants, and total participant support costs for each activity.
- The annual budget should not include budget allocations for annual Council work plan activities.

NCO proposals only

- Annual budgets must include costs to implement the REU Site and Summer Institute programs, including participant support costs for all REU students and Summer Institute attendees.
- Annual budgets must include full travel support for the NIAC and User Forum membership to attend one in-person meeting annually.
- Annual budgets must include full support for the User Forum to conduct and evaluate the annual NHERI user survey.

RAPID Facility proposals only

- The year-two budget should include an increase of up to $1,200,000 for resource procurement and commissioning.

Budget Preparation Instructions:

The **full proposal** must include a budget for each of the five years. FastLane and Grants.gov will automatically provide a cumulative budget.

Include separate budgets for subawards/subcontracts that are $50,000 or greater annually. For subawards/subcontracts less than $50,000

annually, include the costs aggregated on the subaward line of the annual budget. In the budget justification, provide a list of all organizations that will receive less than $50,000 annually and the annual support provided to each organization.

C. Due Dates

- **Letter of Intent Due Date(s)** *(required)* (due by 5 p.m. proposer's local time)**:**

    October 16, 2015

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

    November 04, 2015

D. FastLane/Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: https://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: http://www.grants.gov/web/grants/applicants.html. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

Proposers that submitted via FastLane are strongly encouraged to use FastLane to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables

breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.i. contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.i., prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
   a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
   b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

Reviewers will be asked to evaluate the **strengths and weaknesses** of the proposal in response to the requirements and responsibilities described in Section II as follows:

A. All Proposals (NCO, SimCenter, and RAPID Facility Proposals)

1. How the Science Plan conveys a compelling scientific vision, grand research challenges, and key research questions at the cusp of emerging discoveries in earthquake engineering, wind engineering, and/or multi-hazard engineering.
2. How the proposed project provides unique and essential resources, services, user support, and activities that will enable the natural hazards engineering community to address the grand research challenges and key research questions.
3. Quality of the resources, services, user support, and activities provided to serve as an integral, integrated, and user-oriented component within NHERI.

B. Network Coordination Office (NCO) Proposals Only

1. Quality of the proposed project in responding to the requirements and responsibilities in Section II.C, All Awardees (NCO, CI, SimCenter, and EF, including RAPID Facility) - Common Awardee Requirements and Responsibilities.
2. Quality of the proposed project in responding to the requirements and responsibilities in Section II.D, Network Coordination Office (NCO) Component - Additional Awardee Requirements, Responsibilities, and Key Year-One Milestones.

C. Computational Modeling and Simulation Center (SimCenter) Proposals Only

1. Quality of the proposed project in responding to the requirements and responsibilities in Section II.C, All Awardees (NCO, CI, SimCenter, and EF, including RAPID Facility) - Common Awardee Requirements and Responsibilities.
2. Quality of the proposed project in responding to the requirements and responsibilities in Section II.E, Computational Modeling and Simulation (SimCenter) Component - Additional Awardee Requirements, Responsibilities, and Key Year-One Milestones.

E. RAPID Facility Proposals Only

1. Quality of the proposed project in responding to the requirements and responsibilities in Section II.C, All Awardees (NCO, CI, SimCenter, and EF, including RAPID Facility) - Common Awardee Requirements and Responsibilities.
2. Quality of the proposed project in responding to the requirements and responsibilities in Section II.F, Experimental RAPID Facility Component - Additional Awardee Requirements, Responsibilities, and Key Milestones.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review, Internal NSF Review, Site Visit Review, or Reverse Site Review.

Proposals will be reviewed in accordance with standard NSF external merit review policy, which may consist of a combination of panel and ad hoc mail review. Selected proposals may be further reviewed by a reverse site visit at NSF and/or a campus site visit to the lead institution. Dates for site visits will be communicated by the Lead Cognizant Program Officer to selected PIs as early in the review process as practicable. These dates will be non-negotiable, and it is expected that the PI, co-PIs, and leadership and management team will be available on the scheduled date. It is the responsibility of the PI to assure that contact information for the scheduling of these meetings is correct. Travel and other costs incurred by proposers for this review process will be the responsibility of the proposers. All PIs will receive documentation regarding the review process, including reviews and panel summaries, upon completion of the process.

Upon completion of the NSF merit review process, proposals to be recommended for an award will undergo a management and budget justification review by NSF staff to assess the lead institution's capability to execute the award and the appropriateness of the budget request. Proposers must be available to provide additional business or budgetary information to support the award recommendation. This review may be done by either a visit from NSF staff to the lead institution or by video teleconference.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will be completed and submitted by each reviewer. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Acquisition and Cooperative Support for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Acquisition and Cooperative Support. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process).

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

Special Award Conditions:

The cooperative agreement will be administered by the Division of Civil, Mechanical and Manufacturing Innovation in the Directorate for Engineering and the Division of Acquisition and Cooperative Support in the Office of Budget, Finance, and Award Management.

NSF oversight of the cooperative agreement will include the following:

Award-Specific Programmatic Terms and Conditions, for all Awardees, unless otherwise indicated:

- Review and/or approval of the following:
    - Review and approval of Annual and Final Progress Reports.
    - Review of Quarterly Interim Reports.
    - Review and approval of changes in Key Personnel (leadership and management) positions. Approval from NSF is required before a change is implemented.
    - Review and approval of the Strategic Plan for Operations, including Performance Metrics.
    - Review and approval of Annual Work Plans.
    - Review and approval of each plan for a Conference, Symposium, and Workshop included as part of the Annual Work Plan; these plans must be prepared in accordance with NSF Grant Proposal Guide requirements for Conferences, Symposia and Workshops in effect at the time of plan preparation and must be approved by NSF prior to implementation.
    - Review and approval of the Risk Management System.
    - Review and approval of the documents completed at the end of year one for the RAPID Facility.
    - Review and approval of requests to support graduate students to participate in awardee activities other than the NHERI-wide REU site activity and SimCenter Graduate Research Traineeships. All graduate students supported must be U.S. citizens, U.S. nationals, or permanent residents of the United States.
    - Review and, if required, approval of notifications of incidents related to cybersecurity.
    - Review and, if required, approval of notifications to NSF by the RAPID Facility Awardee about incidents related to EH&S requirements and equipment damage/failure.
    - Awardee-proposed national and international partnerships that require the Awardee's signature on a Memorandum of Understanding or similar documents.
- Site visit merit reviews, to justify continued funding; cross-Awardee merit reviews may be held jointly to evaluate and assess the extent of cross-Awardee coordination:
    - NCO and SimCenter Awardees: Annual site visits, organized by NSF, with external reviewers, with location to be either at NSF or the lead institution.
    - RAPID Facility: Year-one site visit at the facility location, organized by NSF, with external reviewers. In years two through five, annual site visits, organized by NSF, with external reviewers, with the location to be either at NSF or the facility location.
- NSF Business Systems Review, typically scheduled once during the five-year award period, with the review to be conducted within the first two years of the award date.
- RAPID Facility Awardee: Submission to NSF of annual institutional laboratory inspection reports, with a summary of the corrective actions taken.

Award-Specific Financial/Administrative Terms and Conditions, for all Awardees, unless otherwise indicated:

Budgetary Requirements

- National laboratories and private sector companies, as well as non-U.S. institutions, may participate in award activities using their own resources and cannot receive NSF support from an award made under this solicitation; however, this shall not be interpreted to prohibit purchases, services, or sales contracts/agreements with these entities.
- Review and/or approval of the following:
    - Rebudgeting of $50,000 or greater by the Awardee or a subaward.
    - Use of unobligated carryover funds from the prior budget year not intended to be applied to support the next year's annual budget.
    - RAPID Facility Awardee: In the case of major equipment damage, NSF support to restore functionality would be contingent upon the cause of damage, prior equipment utilization history, remaining useful life of the equipment if repaired, future planned use of the equipment by NSF-supported projects, total cost of repair or replacement, quality of maintenance based on historical records, date and nature of original acquisition of the equipment, appropriateness of NSF support, and annual NSF budgets.
- Program income must be certified by the Awardee Authorized Organizational Representative and reported annually. NSF may require the use of program income to offset the NSF support.

- NSF support will not be provided to repair/replace equipment that was damaged or not operational for its intended use prior to the effective start date of the award.

Standard Cooperative Agreement Terms and Conditions, including supplements for managers of Large Facilities, are available at http://www.nsf.gov/awards/managing/co-op_conditions.jsp?org=NSF. These terms and conditions will apply to all NHERI Awardees.

Programmatic and financial/administrative terms and conditions not listed above will be negotiated at the time of award.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). Within 90 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF

website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

The Awardee must submit a comprehensive annual progress report to NSF containing a summary of the progress during the current year against the performance metrics and work plan and the work plan and budget for the next year funding increment. Quarterly interim reports will be submitted to track progress during the current year.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Joy M. Pauschke, Program Director, Division of Civil, Mechanical and Manufacturing Innovation (Lead Cognizant Program Officer), telephone: (703) 292-7024, email: jpauschk@nsf.gov

- William L. Miller (CISE/ACI), Science Advisor, Division of Advanced Cyberinfrastructure, telephone: (703) 292-7886, email: wlmiller@nsf.gov

- Erica Stein, Grants and Agreements Specialist, Division of Acquisition and Cooperative Support, telephone: (703) 292-5399, email: digiovanna-stein@nsf.gov

- Deanna DiGiovanna, Grants and Agreements Specialist, Division of Acquisition and Cooperative Support, telephone: (703) 292-4374, email: digiovanna-stein@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website at https://public.govdelivery.com/accounts/USNSF/subscriber/new?topic_id=USNSF_179.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at http://www.grants.gov.

References:

1. National Earthquake Hazards Reduction Program (NEHRP), *Strategic Plan for the National Earthquake Hazards Reduction Program, Fiscal Years 2009-2013*, October 2008, http://www.nehrp.gov/pdf/strategic_plan_2008.pdf.
2. National Research Council, *National Earthquake Resilience: Research, Implementation, and Outreach*. Washington, DC: The National Academies Press, 2011, http://www.nap.edu/catalog.php?record_id=13092.
3. National Research Council, *Grand Challenges in Earthquake Engineering Research: A Community Workshop Report*. Washington, DC: The National Academies Press, 2011, http://books.nap.edu/catalog.php?record_id=13167.
4. National Science and Technology Council, *Windstorm Impact Reduction Implementation Plan*, http://www.whitehouse.gov/sites/default/files/microsites/ostp/windstorm_impact_reduction_implementation_plan_final.pdf.
5. National Science Board, Hurricane Warning-The Critical Need for a National Hurricane Research Initiative, 2007, http://www.nsf.gov/nsb/publications/landing/nsb06115.jsp?org=NSF.
6. NIST GCR 14-973-13, *Measurement Science R&D Roadmap for Windstorm and Coastal Inundation Impact Reduction*. (This roadmap developmental effort was supported in part by NSF, through award CMMI-1235689, to obtain community input on related long-term fundamental research challenges in windstorm and coastal inundation impact reduction), http://www.nist.gov/customcf/get_pdf.cfm?pub_id=915541.
7. National Science Foundation, *Investing in Science. Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018*, http://www.nsf.gov/about/performance/strategic_plan.jsp.
8. National Science Foundation, *Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21)*, http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504730.

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The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

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Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

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PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Office of the General Counsel
National Science Foundation
Arlington, VA 22230

X. APPENDIX

FULL PROPOSAL COMPLIANCE CHECKLIST

The Division of Civil, Mechanical and Manufacturing Innovation will administratively review proposals for compliance with the version of NSF Grant Proposal Guide (GPG) in effect on the full proposal submission deadline date and with the requirements for a full proposal submitted to this program solicitation. Proposals not compliant with the requirements in the GPG and this solicitation (note that this solicitation has deviations

from the GPG in Sections IV, Eligibility Information, and Section V, Proposal Preparation and Submission Instructions) will be returned without review. Proposers should use the checklist below to review their full proposal for compliance prior to submission. The section listed in parenthesis is the section in the solicitation for compliance. A proposal will be deemed compliant and will be considered for merit review if it complies with the following requirements; otherwise the proposal will be returned without review if it does not comply with one or more of the following requirements:

1. Full proposal is submitted only for the Network Coordination Office, Computational Modeling and Simulation Center, or Post-Disaster, Rapid Response Research Facility component of NHERI.
2. Full proposal is compliant with the NSF 15-1, Grant Proposal Guide (GPG), unless deviations from the GPG are noted in the solicitation in Sections IV and V.
3. Full proposal is submitted by the full proposal deadline, November 4, 2015, 5 p.m. proposer's local time. To ensure that this deadline is met, proposers are strongly encouraged to submit the full proposal to receive a FastLane submittal stamped time no later than November 4, 2015, 4:59 pm proposer's local time, to ensure that the November 4, 2015, 5 p.m. proposer's local time deadline is met. A proposal submitted past November 4, 2015, 5 p.m. proposer's local time, even one second or less after the full proposal deadline, will be returned without review.
4. Full proposal is submitted by an organization that is a University or College that is accredited in, and having a campus located in, the United States acting on behalf of its faculty members (Section IV).
5. A full proposal involving more than one organization is submitted as a single administrative package from the lead institution (Section IV).
6. RAPID Facility proposal has all proposed facility resources owned, operated, and maintained by the lead academic institution and located within the United States to facilitate access by NSF-supported users (Section IV).
7. An academic institution submits no more than two proposals to this solicitation (Section IV).
8. An academic institution submits no more than one proposal to any of the following proposal categories: Network Coordination Office, Computational Modeling and Simulation Center, and RAPID Facility (Section IV).
9. Principal Investigator (PI) or co-PI appears in no more than one proposal as a PI or co-PI (Section IV).
10. Principal Investigator (PI) or co-PI is not a PI or co-PI on an award made under the NSF 14-605 solicitation (Section IV).
11. Proposal is submitted by an academic institution that has submitted a Letter of Intent (LOI) by the Letter of Intent Due Date (Section V.A).
12. Project Description does not exceed 55 pages, inclusive of Sections 1-17 (Section V.A).
13. Names of unfunded collaborators (individuals and organizations) are not identified anywhere in the proposal (Section V.A).
14. Proposal does not include names and organizational affiliations of any committee/advisory board members and committee/advisory board chairs unless they are individuals who are explicitly budgeted to receive financial salary support of at least one month annually in the NSF budget request and included as such in the budget justification (this includes personnel at the lead institution, subawards, and consultants) (Section V.A).
15. Project Description includes Sections 1-16, in the order listed, and uses the section headings shown in Section V.A of the solicitation (Section 17 is optional) (Section V.A).
16. Project Description starts with Table 1, List of Participating Organizations, and Table 2, List of Project Personnel, with no introductory sentences or paragraphs preceding these tables (Section V.A).
17. Project Description, Table 2, List of Project Personnel, has all leadership and management positions with individuals named (Section V.A).
18. Project Description, Section 2, includes the two sections with the subheadings: Section 2.A, Intellectual Merit, and Section 2.B, Broader Impacts of the Proposed Work (Section V.A).
19. Project Description, Section 3, Results Prior NSF Support, follows the instructions in the Grant Proposal Guide, Section II.C.2.d.iii, for reporting on results from prior NSF support for the PI and each co-PI named on the proposal cover sheet (Section V.A). Proposers are reminded to thoroughly review this section of the GPG to ensure that the submitted proposal is fully compliant with this GPG requirement (Section V.A).
20. NCO proposals: Project Description does not identify names of strategic experimental facility partners (Section V.A).
21. Facilities, Equipment and Other Resources section does not include any quantifiable financial information about the resources that will be made available as a NHERI resource (Section V.A).
22. Facilities, Equipment and other Resources section does not identify the names of any unfunded collaborators (individual and organizations) in this section (Section V.A).
23. Special Information and Supplementary Documentation section includes the information requested in Sections A through E, using the headings shown, and does not exceed the specified page limits (Section V.A). If a particular section is not applicable, the proposal includes the section heading and writes below "Not Applicable." (Section V.A).
24. Special Information and Supplementary Documentation section does not include letters from project personnel requesting support in Tables 1 and 2 (Section V.A).
25. Special Information and Supplementary Documentation section: As unfunded collaborators are not to be identified in the proposal, this section does not include letters from unfunded collaborators (individuals and organizations) (Section V.A).
26. Special Information and Supplementary Documentation section, Section C, Biographical Sketches of Additional Project Personnel, does not include more than ten biosketches (Section V.A).
27. Requested annual and total budgets do not exceed the budget amounts listed in Section III, Award Information (Section V.B).
28. Requested annual budgets: Each individual requesting financial support is supported for at least one month annually during each year of planned participation in the project (Section V.B).

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