FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT

U.S. Department of Energy

Office of Science

Office of Advanced Scientific Computing Research (ASCR)

Scientific Discovery through Advanced Computing Institutes: Scientific Data Management, Analysis and Visualization

Funding Opportunity Number: DE-FOA-0000589

Announcement Type: Amendment

CFDA Number: 81.049

AMENDMENT ISSUED:	**October 7, 2011**
ISSUE DATE:	**September 16, 2011**
Letter of Intent Due Date: **(Strongly Encouraged)**	**October 12, 2011**
Application Due Date:	**November 9, 2011, 11:59 p.m. Eastern Time**

This Funding Opportunity Announcement (FOA) was deleted from Grants.gov and reposted on October 7, 2011. A new Application Package (Forms) was posted at that time. The new Application Package is identical to the old one except it is encoded differently behind the scenes, so the information requested on the forms remains the same. Application Packages downloaded prior to October 7 will generate errors upon submission. If you downloaded the Application Package prior to October 7, please discard it, download a new Application Package, and use the new one for submitting your application. No other changes were made to this FOA on October 7. We apologize for the inconvenience.

NOTE: REQUIREMENTS FOR GRANTS.GOV

Where to Submit: Applications must be submitted through Grants.gov to be considered for award. You cannot submit an application through Grants.gov unless you are registered. Please read the registration requirements carefully and start the process immediately. Remember you have to update your Central Contract Registry (CCR) registration annually. If you have any questions about your registration, you should contact the Grants.gov Helpdesk at 1-800-518-4726 to verify that you are still registered in Grants.gov.

Registration Requirements: There are several one-time actions you must complete in order to submit an application through Grants.gov (i.e., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the CCR, register with the credential provider, and register with Grants.gov). To register with Grants.gov go to "Get Registered" at http://grants.gov/applicants/get_registered.jsp. Use the Grants.gov Organization Registration Checklist at http://www.grants.gov/assets/OrganizationRegCheck.pdf to guide you through the process. Designating an E-Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in the CCR registration process. Applicants, who are not registered with CCR and Grants.gov, should allow at least 21 days to complete these requirements. It is suggested that the process be started as soon as possible.

IMPORTANT NOTICE TO POTENTIAL APPLICANTS: When you have completed the process, you should call the Grants.gov Helpdesk at 1-800-518-4726 to verify that you have completed the final step (i.e. Grants.gov registration).

Questions: Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or support@grants.gov. Part VII of this Funding Opportunity Announcement (FOA) explains how to submit other questions to the Department of Energy (DOE).

Application Receipt Notices

After an application is submitted, the Authorized Organization Representative (AOR) will receive a series of four e-mails. It is extremely important that the AOR watch for and save each of the emails. It may take up to two (2) business days from application submission to receipt of email Number 2. The titles of the four e-mails are:

Number 1 - Grants.gov Submission Receipt Number
Number 2 - Grants.gov Submission Validation Receipt for Application Number
Number 3 - Grants.gov Grantor Agency Retrieval Receipt for Application Number
Number 4 - Grants.gov Agency Tracking Number Assignment for Application Number

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PART I – FUNDING OPPORTUNITY DESCRIPTION

GENERAL INQUIRIES ABOUT THIS FOA SHOULD BE DIRECTED TO:

Technical/Scientific Program Contacts:

Program Manager: Dr. Lucy Nowell, (301) 903-3191
Office of Advanced Scientific Computing Research, SC-21.1

Program Manager: Dr. Steven L. Lee, (301) 903-5710
Office of Advanced Scientific Computing Research, SC-21.1
E-mail: scidac-institutes@ascr.doe.gov

STATUTORY AUTHORITY

Public Law 95-91, US Department of Energy Organization Act
Public Law 109-58, Energy Policy Act of 2005

APPLICABLE REGULATIONS

U.S. Department of Energy Financial Assistance Rules, codified at 10 CFR Part 600
U.S. Department of Energy, Office of Science Financial Assistance Program Rule, codified at 10 CFR Part 605

SUMMARY:

The Office of Advanced Scientific Computing Research (ASCR) of the Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving Applications to the Scientific Discovery through Advanced Computing (SciDAC) program for a SciDAC Institute for scientific data management, analysis and visualization. The proposed Institute will serve as a single point of contact for scientists participating in Scientific Computation Application Partnerships (hereafter, Partnerships) seeking ASCR-supported collaborators who will work with them to more efficiently and effectively manage, analyze, visualize and understand their scientific data. As a focal point for interdisciplinary collaboration, the Institute will be the primary mechanism for transferring technical solutions into operational use by application scientists on leadership-class computing facilities over the next 5 years. More specific information is included under SUPPLEMENTARY INFORMATION below.

A companion Program Announcement to DOE National Laboratories, LAB 11-589, will be posted on the SC Grants and Contracts web site at: http://www.science.doe.gov/grants

SUPPLEMENTARY INFORMATION:

The collective mission of the SciDAC Institutes is to provide intellectual resources in applied mathematics and computer science, expertise in algorithms and methods, and scientific software tools to advance scientific discovery through modeling and simulation in areas of strategic importance to the Office of Science and the National Nuclear Security Administration (NNSA). Funding opportunities for SciDAC science domains will be announced through several forthcoming Program Announcements to DOE National Laboratories (Program Announcement) and Funding Opportunity Announcements (FOAs). These Program Announcements and FOAs, issued by ASCR's SciDAC partners, provide opportunities to establish collaborative projects among DOE application scientists and the SciDAC Institutes.

The SciDAC program was initiated in 2001 as a partnership involving all of the SC program offices. The objective was to dramatically accelerate progress in scientific computing that delivers breakthrough scientific results through partnerships comprised of applied mathematicians, computer scientists, and scientists from other disciplines. The SciDAC program was re-competed in 2006, and the partnerships were extended to include the DOE NNSA and the National Science Foundation (NSF). Through partnerships with ASCR-funded mathematicians and computer scientists, SciDAC applications pursued computational solutions to challenging problems in climate science, fusion research, high energy physics, nuclear physics, astrophysics, materials science, chemistry, particle accelerators, biology and the reactive subsurface flow of contaminants through groundwater. Today the SciDAC program is recognized as the leader in accelerating the use of high-performance computing to advance the state of knowledge in science applications.

The development of SciDAC tools and resources, funded under this FOA, is intended for computational systems such as those existing and planned for at the Oak Ridge and Argonne Leadership Computing Facilities, the National Energy Research Scientific Computing Center, and similar world-class computing facilities **over the next 5 years**. Specific goals and objectives for the SciDAC Institutes are:

- Tools and resources for lowering the barriers to effectively use state-of-the-art computational systems;
- Mechanisms for taking on computational grand challenges across different science application areas;
- Mechanisms for incorporating and demonstrating the value of basic research results from Applied Mathematics and Computer Science; and
- Plans for building up and engaging our nation's computational science research communities.

In a relatively short time, science has shifted from data scarcity to an overwhelming abundance of data, as simulations and experiments generate many petabytes of data, with some sciences facing exabytes of data near term. Exponential growth in data generation rates result from a combination of improved sensors, refinements in scale, and improved availability of and access to high-performance computing systems. For example, the Large Hadron Collider (LHC) is expected to produce roughly 15 petabytes of data annually over its estimated 15 year lifespan (http://public.web.cern.ch/Public/en/LHC/Computing-en.html).

The proposed Institute will serve as a single point of contact for scientists participating in Partnerships seeking ASCR-supported collaborators who will work with them to more efficiently and effectively manage, analyze, visualize and understand their scientific data. As a focal point for interdisciplinary collaboration, the Institute will be the primary mechanism for transferring technical solutions into operational use by application scientists on leadership-class computing facilities over the next 5 years.

The Institute will leverage research and mature technologies from basic research, making them accessible to application scientists, assisting in their use, and supporting scientists in understanding the results. Technologies of potential interest cover a broad range but, taken together, should result in a comprehensive portfolio of capabilities that is responsive to the SciDAC mission. A proposed Institute must describe the nature and range of collaborations and capabilities that it would make available to application scientists.

Research may be required to transform technologies from the proof-of-concept stages supported in basic research into usable and useful systems that support scientific discovery. Research topics may include, but are not limited to,

- Research to evaluate and further mature candidate solutions and adapt them for use by application scientists;
- Integration of new approaches and/or capabilities into existing tools or technologies to meet the challenges of real data at scale for diverse science applications; and/or
- Usability evaluation and iterative design of user interfaces for scientific data management, analysis and visualization systems to make the technologies more accessible to scientists.

For the purposes of this FOA, out of scope are

- Efforts aimed at porting existing scientific data management, analysis and visualization applications/solutions to new computing platforms that won't be delivered within the next five years;
- Research aimed at creating new scientific data management, analysis and visualization applications;
- Delivery of technical solutions as a service rather than as a collaborative process of engagement; and
- Research aimed at exascale computing systems.

Sharing, re-use, and re-purposing of scientific data and integration of data from multiple simulations and multiple disciplines are required to address mission-critical challenges in complex systems. Analysis of massive heterogeneous data sets is required, for example, for understanding the impact of stockpile decay on containment materials over decades or understanding the causes and potential impacts of climate change. Integration and/or comparison of data from simulations and observations are necessary for model validation, as well as requiring analysis in their own right.

The value of scientific data is realized only when data are effectively analyzed and results are presented in an understandable way. The challenges of analyzing massive scientific data sets are compounded by data complexity that results from heterogeneous methods and devices for data

generation and capture and the inherently multi-scale, multi-physics nature of many sciences, resulting in data with hundreds of attributes or dimensions and spanning multiple spatial and temporal scales. Data analysis may be intended to confirm or deny a known hypothesis, but data may also be analyzed in hopes of finding previously unknown patterns or features – to discover the unexpected. Comparative analysis may also be required to determine the similarities among and differences between data from multiple runs of a simulation or between simulation output and experimental data.

Visual analysis systems that enable interaction between the scientist users, the data analysis system, and the data are critical for supporting scientific discovery and understanding, as well as enhancing communication about science outcomes with the science community, policy makers, and the public.

A particular challenge for a proposed SciDAC Institute is the need to provide sufficient flexibility to incorporate new data management, analysis and visualization technologies and solutions that arise over the life of the Institute, as well as to meet the changing needs of application scientists and respond to architectural advances over the next 5 years.

One of the primary metrics for the success of a SciDAC Institute is the extent to which its deliverables are used by application scientists. An equally important metric is the extent to which Institute researchers actively collaborate and leverage their expertise in achieving that success. This FOA describes the process by which a proposed Institute is to be developed, submitted, and merit reviewed. Although the work of a proposed Institute is not science application-specific, it is expected–for the purposes of this FOA–to be application-, architecture-, and Institutes-aware.

Institutes-aware. The SciDAC Institutes provide a foundation for efforts by applied mathematicians and computer scientists to systematically address technical challenges that are inherent to the scale of new architectures and that are common across a wide range of science applications. A proposed Institute must not only make a compelling case for its own intrinsic capabilities, but also describe processes for effectively leveraging the capabilities of the recently awarded SciDAC Institutes. (http://science.energy.gov/ascr/research/scidac/scidac-institutes/)

- **FASTMath** – Frameworks, Algorithms, and Scalable Technologies for Mathematics (Director: Lori Diachin, Lawrence Livermore National Laboratory). Topics covered include: structured and unstructured mesh tools and mesh-solver interfaces, linear and nonlinear solvers, eigensolvers, particle methods, time integration, differential and variational inequalities
- **QUEST** – Quantification of Uncertainty in Extreme Scale Computations (Director: Habib Najm, Sandia National Laboratories). Topics covered include: forward uncertainty propagation, reduced stochastic representation, inverse problems, experimental design and model validation, and fault tolerance
- **SUPER** – Sustained Performance, Energy and Resilience (Director: Robert Lucas, University of Southern California). Topics covered include: performance engineering (including modeling and auto-tuning), energy efficiency, resilience and optimization

An important benefit of the Institutes and Partnerships is that innovative science projects can be accommodated by the Institutes' pooling of a broad range of computational skills that is otherwise not readily available to DOE domain scientists. To this end, a proposed SciDAC Institute must include an explanation of its relationship to the three recently awarded Institutes, as well as a plan for outreach to and support of Partnerships.

Architecture-aware Scientific Data Management, Analysis and Visualization. Over the next 5 years, the main architectural features of existing and planned computing environments include: heterogeneous nodes (CPUs, GPUs), different memory hierarchies, and varying trade-off costs for computation versus data movement. Tools and methodologies for coping with and taking full advantage of such architectural complexities are an important practical consideration. A roadmap, factsheet and listing of state-of-the-art computational systems are provided at:

- Petascale Science Delivered, Oak Ridge Leadership Computing Facility Annual Report 2009, http://www.olcf.ornl.gov/wp-content/uploads/2010/03/OLCFAR2009.pdf
- Argonne Leadership Computing Facility Fact Sheet, 2011, http://www.alcf.anl.gov/news/media_files/alcf-fctsht-0411_r6.pdf
- NERSC computational systems, http://www.nersc.gov/users/computational-systems/

A proposed Institute should describe its plans with respect to these challenges and resources.

Application-aware. The application-aware features of a SciDAC Institute are essential in ensuring that its deliverables are used by application scientists (a primary metric of success). Nevertheless, it is difficult to anticipate the near-term and changing computational science needs of domain scientists. This observation motivates the need to develop intellectual resources and tools to meet cross-cutting computational science needs for DOE and SC missions.

Management structure. A proposed SciDAC Institute must describe a management structure that enables it to function efficiently and to collaborate effectively and quantifiably with the science applications as well as with each other (see Post-Award process below). Institute structure and management must be sufficiently flexible to adapt quickly to changing technical challenges and scientific needs. Each Institute must identify a Director, Principal Investigator(s), and Senior/Key Personnel. Typical duties, responsibilities and authorities for each category are provided below:

- **Institute Director** - The SciDAC Institute Director is the Lead Principal Investigator and must be employed by the Lead institution. The SciDAC Institute Director will serve as the primary contact responsible for communications with the DOE Program Officer on behalf of all of the Principal Investigators in the Institute.
- **Principal Investigator** - A Principal Investigator is the individual designated by the research organization and empowered with the appropriate level of authority and responsibility for the proper conduct of the research within that organization. These authorities and responsibilities include the appropriate use of funds and administrative requirements such as the submission of scientific progress reports to DOE. When an organization designates more than one Principal Investigator, it identifies them as individuals who share the authority and responsibility for leading and directing the research, intellectually and logistically.
- **Senior/Key Personnel** - A senior/key person is an individual who contributes in a substantive, measurable way to the scientific/technical development or execution of the project.

This definition includes, but is not limited to, the SciDAC Institute Director and the Principal Investigator(s).

Post-Award process. Upon notification of award, the Institute Director will be asked to serve with the three previously awarded Institute Directors on a SciDAC Institutes Directors Executive Council. This group will be chartered to develop and submit an operating plan for the SciDAC Institutes. The plan will describe the processes and procedures to be used for coordination and communication among the Institutes. The plan will also describe the process used by each Institute to review activities within that Institute, re-prioritize as appropriate and communicate those results to all of the Institutes, the Executive Council, and ASCR. As Partnerships (i.e., ASCR and other DOE Programs) develop, the Executive Council will document its approach for working with these Partnerships and present it to DOE. Additional guidance will be provided in the award notification letter.

SC Application Partnerships

New FOAs and Program announcements will be issued by each SC office and in partnership with ASCR. In each case, a successful Partnership with SciDAC Institutes will:

1. Exploit leadership class computing resources to advance scientific frontiers in an area of strategic importance to SC, and
2. Effectively link to the intellectual resources in applied mathematics and computer science, expertise in algorithms and methods, and scientific software tools at one or more SciDAC Institutes.

For official postings see the Office of Science Grants and Contracts web site, http://www.science.doe.gov/grants.

Collaboration

Collaborative research projects with other institutions, such as universities, industry, non- profit organizations, and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories, are strongly encouraged. Collaborative applications submitted from different institutions, which are directed toward a single SciDAC Institute, should clearly indicate they are part of a proposed collaboration and contain the same title, Abstract and Narrative for that SciDAC Institute research project. In addition, such applications must describe the work and the associated budget for the research effort being performed under the leadership of the Principal Investigator at that participating institution.

These collaborative applications should all have the same title as the Lead Institution. Each collaborating institution submitting an application must use the same title in Block 11 of the SF 424 (R&R) form.

PART II – AWARD INFORMATION

A. TYPE OF AWARD INSTRUMENT.

DOE anticipates awarding Cooperative Agreements under this FOA.

B. ESTIMATED FUNDING.

Awards are expected to be made for a period of five years at a funding level of up to $5,000,000 per year to support one SciDAC Institute award in Fiscal Year 2012, with out-year support contingent on the availability of appropriated funds and satisfactory progress.

Although a SciDAC Institute may be supported by a single award, ASCR expects an Institute will be a collaboration comprised of several separate awards. ASCR reserves the right to make fewer awards than would be possible at $5,000,000 per year, if an insufficient number of applications are judged to be of suitable scientific quality or of sufficient relevance to the programs described above.

DOE is under no obligation to pay for any costs associated with the preparation or submission of an application. DOE reserves the right to fund, in whole or in part, any, all, or none of the applications submitted in response to this FOA.

C. MAXIMUM AND MINIMUM AWARD SIZE.

The award size will depend on the number of meritorious applications and the availability of appropriated funds. Applications requesting less than $150,000 per year are unlikely to be successful collaborators in a SciDAC Institute.

D. EXPECTED NUMBER OF AWARDS.

ASCR expects to support one SciDAC Institute. The exact number of awards will depend on the number of meritorious applications and the availability of appropriated funds.

E. ANTICIPATED AWARD SIZE.

The award size will depend on the number of meritorious applications and the availability of appropriated funds. Award sizes for each collaborating institution are anticipated to range from $150,000 to over $1,000,000 per year.

F. PERIOD OF PERFORMANCE.

A maximum of five years will be considered. Out-year funding will depend upon suitable progress and the availability of appropriated funds.

G. TYPE OF APPLICATION.

DOE will accept new applications under this FOA.

PART III - ELIGIBILITY INFORMATION

A. ELIGIBLE APPLICANTS.

All types of domestic entities are eligible to apply, except other Federal agencies, Federally Funded Research and Development Center (FFRDC) Contractors, and nonprofit organizations described in section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995.

B. COST SHARING.

Cost sharing is not required.

C. OTHER ELIGIBILITY REQUIREMENTS.

N/A

PART IV – APPLICATION AND SUBMISSION INFORMATION

A. ADDRESS TO REQUEST APPLICATION PACKAGE.

Application forms and instructions are available at Grants.gov. To access these materials, go to http://www.grants.gov, select "**Apply for Grants**", and then select "**Download a Grant Application Package**". Enter the CFDA and/or the funding opportunity number located on the cover of this FOA and then follow the prompts to download the application package.

B. LETTER OF INTENT AND PRE-APPLICATION

1. Letter of Intent.

Each Director for a proposed Institute is strongly encouraged to submit a Letter of Intent (LOI) by Wednesday, October 12, 2011, 11:59 P.M. Eastern Time. The LOI should include the following:

1. A cover sheet containing the name and mailing address of the Director's institution; the planned title of the SciDAC Institute; the estimated annual cost and total cost of the project over the five-year project period; the name, institutional affiliation, e-mail address, and telephone number of the SciDAC Institute Director, Principal Investigator(s), and Senior/Key personnel expected to be involved in the planned project.
2. A one-page overview of the strategic plan for the proposed SciDAC Institute, including the vision, goals and key objectives.
3. A one-page overview of the research plan.

Letters of Intent will be used to organize and expedite the merit review process. Consequently, the submission of a LOI is strongly encouraged but not required. The absence of a LOI will not negatively affect a thorough evaluation of a responsive formal application submitted in a timely fashion. The LOI should be sent by E-mail as a PDF file to: scidac-institutes@ascr.doe.gov. Please include the phrase "Letter of Intent" in the subject line.

2. Pre-Application.

N/A

C. CONTENT AND FORM OF APPLICATION – SF 424 (R&R)

You must complete the mandatory forms and any applicable optional forms (e.g., SF-LLL-Disclosure of Lobbying Activities) in accordance with the instructions on the forms and the additional instructions below**. Files that are attached to the forms must be in Adobe Portable Document Format (PDF) unless otherwise specified in this FOA.**

1. SF 424 (R&R)

Complete this form first to populate data in other forms. Complete all the required fields in accordance with the pop-up instructions on the form. The list of certifications and assurances referenced in Field 17 can be found on the DOE Financial Assistance Forms Page at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms under Certifications and Assurances.

2. RESEARCH AND RELATED Other Project Information.

Complete questions 1 through 6 and attach files. The files must comply with the following instructions:

Project Summary/Abstract (Field 7 on the Form).

The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project director/principal investigator(s) (PD/PI), the project title, the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (i.e., benefits, outcomes), and major participants (for collaborative projects). This document must not include any proprietary or sensitive business information as the Department may make it available to the public. The project summary must not exceed 1 page when printed using standard 8.5" by 11" paper with 1" margins (top, bottom, left and right) with font not smaller than 11 point. To attach a Project Summary/Abstract, click "Add Attachment."

Project Narrative (Field 8 on the Form).

The project narrative **must not exceed 25 pages** of technical information, including charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right). EVALUATORS WILL ONLY REVIEW THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE. The font must not be smaller than 11 point.

Please do not submit general letters of support as these are not used in making funding decisions and can interfere with the selection of peer reviewers.

Do not include any Internet addresses (URLs) that provide information necessary to review the application, because the information contained in these sites will not be reviewed. See Part VIII.D for instructions on how to mark proprietary application information. To attach a Project Narrative, click "Add Attachment."

The application narrative should begin with a cover page that includes: the project title, the Lead PI's name and complete contact information.

The cover page must also include the following information (this page will not count in the project narrative page limitation):

Applicant/Institution:
Street Address/City/State/Zip:
Principal Investigator:
Postal Address:
Telephone Number:
Email:
Funding Opportunity Announcement Number: DE-FOA-0000589

DOE/Office of Science Program Office: Office of Advanced Scientific Computing Research (ASCR)
DOE/Office of Science Program Office Technical Contact: Dr. Lucy Nowell

Is this a Collaboration? If yes, please list ALL Collaborating Institutions/PIs* and indicate which ones will also be submitting applications. Also indicate the PI who will be the point of contact and coordinator for the combined research activity.

* Note that collaborating applications must be submitted separately. However, if you are submitting as a Lead Institution, in addition to meeting all criteria for submitting a peer reviewable application, please provide the following information about the SciDAC Institute in the form of a table as shown below:

- Name of the SciDAC Institute and the Institute Director
- Identify the collaborating Institutions and the Principal Investigators at each Institution
- Proposed annual budget for the SciDAC Institute and for each collaborating Institution.

Sample Table for the Lead Institution ($ in thousands)

SciDAC Institute	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Name of the SciDAC Institute and the Institute Director	$	$	$	$	$	$
Collaborating Institutions						
(Start with Lead Institution) Name of Institution and PI	$	$	$	$	$	$
Name of Institution and PI	$	$	$	$	$	$
Name of Institution and PI	$	$	$	$	$	$
TOTALS	$	$	$	$	$	$

If you are submitting an application as a collaborator within a SciDAC Institute, please include the name of the SciDAC Institute in the title of your application, and identify the Lead Institution and Institute Director in your project summary.

Project Objectives:

This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.

The Project Narrative comprises the research plan for the project, it should contain enough background material in the Introduction, including review of the relevant literature, to demonstrate sufficient knowledge of the state of the science. The major part of the narrative should be devoted to a description and justification of the proposed project, including details of the method to be used. It should also include a timeline for the major activities of the proposed project, and should indicate which project personnel will be responsible for which activities.

Appendix 1: Biographical Sketch.
Provide a biographical sketch for the project director/principal investigator (PD/PI) and each senior/key person listed in Section A on the R&R Budget form. **Provide the Biographical Sketch information as an Appendix to your project narrative. Do not attach a separate file. The Biographical Sketch Appendix will not count in the project narrative page limitation.**

The biographical information (curriculum vitae) for each person must not exceed 2 pages when printed on 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right) with font not smaller than 11 point and must include:

> *Education and Training*. Undergraduate, graduate and postdoctoral training, provide institution, major/area, degree and year.
>
> *Research and Professional Experience*: Beginning with the current position list, in chronological order, professional/academic positions with a brief description.
>
> *Publications*. Provide a list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address if available electronically. Patents, copyrights and software systems developed may be provided in addition to or substituted for publications.
>
> *Synergistic Activities*. List no more than 5 professional and scholarly activities related to the effort proposed.
>
> *Identification of Potential Conflicts of Interest or Bias in Selection of Reviewers.* Provide the following information in this section:
>
> Collaborators and Co-editors: List in alphabetical order all persons, including their current organizational affiliation, who are, or who have been, collaborators or co-authors with you on a research project, book or book article, report, abstract, or paper during the 48 months preceding the submission of this application. For publications or

collaborations with more than 10 authors or participants, only list those individuals in the core group with whom the Principal Investigator interacted on a regular basis while the research was being done. Also, list any individuals who are currently, or have been, co-editors with you on a special issue of a journal, compendium, or conference proceedings during the 24 months preceding the submission of this application. If there are no collaborators or co-editors to report, state "None."

Graduate and Postdoctoral Advisors and Advisees: List the names and current organizational affiliations of your graduate advisor(s) and principal postdoctoral sponsor(s) during the last 5 years. Also, list the names and current organizational affiliations of your graduate students and postdoctoral associates during the past 5 years.

Appendix 2: Current and Pending Support.
Provide a list of all current and pending support (both Federal and non-Federal) for the Project Director/Principal Investigator(s) (PD/PI) and senior/key persons, including subawardees, for ongoing projects and pending applications. For each organization providing support, show the total award amount for the entire award period (including indirect costs) and the number of person-months per year to be devoted to the project by the senior/key person. **Provide the Current and Pending Support as an Appendix to your project narrative. Do not attach a separate file. The Current and Pending Support Appendix will not count in the project narrative page limitation.** Concurrent submission of an application to other organizations for simultaneous consideration will not prejudice its review.

Appendix 3: Bibliography and References Cited.
Provide a bibliography of any references cited in the Project Narrative. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. Include only bibliographic citations. Applicants should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the application. **Provide the Bibliography and References Cited information as an Appendix to your project narrative. Do not attach a separate file. The Bibliography and References Cited Appendix will not count in the project narrative page limitation.**

Appendix 4: Facilities and Other Resources.
This information is used to assess the capability of the organizational resources, including subawardee resources, available to perform the effort proposed. Identify the facilities to be used (Laboratory, Animal, Computer, Office, Clinical and Other). If appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work. Describe other resources available to the project (e.g., machine shop, electronic shop) and the extent to which they would be available to the project. **Provide the Facility and Other Resource information as an Appendix to your project narrative. Do not attach a separate file. The Facility and Other Resource Appendix will not count in the project narrative page limitation.**

Appendix 5: Equipment.
List major items of equipment already available for this project and, if appropriate identify location and pertinent capabilities. **Provide the Equipment information as an Appendix to your project narrative. Do not attach a separate file. The Equipment Appendix will not count in the project narrative page limitation.**

Appendix 6: Other Attachment.
If you need to elaborate on your responses to questions 1-6 on the "Other Project Information" document, **please provide the Other Attachment information as an Appendix to your project narrative. Do not attach a separate file. The Other Attachment Appendix will not count in the project narrative page limitation.**

Do not attach any of the requested Appendices described above as files for fields 9, 10, 11, and 12. Instead follow the above instructions to include the information as Appendices to the project narrative file (these Appendices will not count in the project narrative page limitation).

3. RESEARCH AND RELATED BUDGET.
Complete the Research and Related Budget form in accordance with the instructions on the form and the following instructions. You must complete a separate budget for each year of support requested. The form will generate a cumulative budget for the total project period. You must complete all the mandatory information on the form before the NEXT PERIOD button is activated. You may request funds under any of the categories listed as long as the item and amount are necessary to perform the proposed work, meet all the criteria for allowability under the applicable Federal cost principles, and are not prohibited by the funding restrictions in this FOA (See PART IV, G).

Budget Justification (Field K on the form).
Provide the required supporting information for the following costs: equipment; domestic and foreign travel; participant/trainees; material and supplies; publication; consultant services; ADP/computer services; subaward/consortium/contractual; equipment or facility rental/user fees; alterations and renovations; and indirect cost type. Provide any other information you wish to submit to justify your budget request. **Attach a single budget justification file for the entire project period in Field K.** The file automatically carries over to each budget year.

4. R&R SUBAWARD BUDGET ATTACHMENT(S) FORM.
Budgets for Subawardees, other than DOE FFRDC Contractors. You must provide a separate cumulative R&R budget for each subawardee that is expected to perform work estimated to be more than $100,000 or 50 percent of the total work effort (whichever is less). If you are selected for award, you must submit a multi-year budget for each of these subawardees. Download the R&R Budget Attachment from the R&R SUBAWARD BUDGET ATTACHMENT(S) FORM and e-mail it to each subawardee that is required to

submit a separate budget. After the Subawardee has e-mailed its completed budget back to you, attach it to one of the blocks provided on the form. Use up to 10 letters of the subawardee's name (plus .xfd) as the file name (e.g., ucla.xfd or energyres.xfd).

5. PROJECT/PERFORMANCE SITE LOCATION(s)
Indicate the primary site where the work will be performed. If a portion of the project will be performed at any other site(s), identify the site location(s) in the blocks provided.

Note that the Project/Performance Site Congressional District is entered in the format of the 2 digit state code followed by a dash and a 3 digit Congressional district code, for example VA-001. Hover over this field for additional instructions.

Use the Next Site button to expand the form to add additional Project/Performance Site Locations.

6. SF-LLL Disclosure of Lobbying Activities
If applicable, complete SF- LLL. Applicability: If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the grant, you must complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying."

Summary of Required Forms/Files
Your application must include the following documents:

Name of Document	Format	Attach to
SF 424 (R&R)	Form	N/A
RESEARCH AND RELATED Other Project Information	Form	N/A
Project Summary/Abstract	PDF	Field 7
Project Narrative, including required appendices	PDF	Field 8
RESEARCH & RELATED BUDGET	Form	N/A
Budget Justification	PDF	Field K
PROJECT/PERFORMANCE SITE LOCATION(S)	Form	N/A
SF-LLL Disclosure of Lobbying Activities, if applicable	Form	N/A

D. SUBMISSIONS FROM SUCCESSFUL APPLICANTS.
If selected for award, DOE reserves the right to request additional or clarifying information for any reason deemed necessary, including, but not limited to:

- Indirect cost information
- Other budget information

- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5)
- Representation of Limited Rights Data and Restricted Software, if applicable
- Commitment Letter from Third Parties Contributing to Cost Sharing, if applicable.

E. SUBMISSION DATES AND TIMES.

1. Letter of Intent.

Each Director for a proposed Institute is strongly encouraged to submit a Letter of Intent (LOI) by Wednesday, October 12, 2011, 11:59 P.M. Eastern Time. The LOI should include the following:

1. A cover sheet containing the name and mailing address of the Director's institution; the planned title of the SciDAC Institute; the estimated annual cost and total cost of the project over the five-year project period; the name, institutional affiliation, e-mail address, and telephone number of the SciDAC Institute Director, Principal Investigator(s), and Senior/Key personnel expected to be involved in the planned project.
2. A one-page overview of the strategic plan for the proposed SciDAC Institute, including the vision, goals and key objectives.
3. A one-page overview of the research plan.

Letters of Intent will be used to organize and expedite the merit review process. Consequently, the submission of a LOI is strongly encouraged but not required. The absence of a LOI will not negatively affect a thorough evaluation of a responsive formal application submitted in a timely fashion. The LOI should be sent by E-mail as a PDF file to: scidac-institutes@ascr.doe.gov. Please include the phrase "Letter of Intent" in the subject line.

2. Pre-Application.

N/A

3. Formal Applications.

APPLICATION DUE DATE: November 9, 2011, 11:59 PM Eastern Time

Formal applications submitted in response to this FOA must be received by November 9, 2011, 11:59 PM Eastern Time, to permit timely consideration of awards in Fiscal Year 2012. **You are encouraged to submit your application well before the deadline. APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.**

F. INTERGOVERNMENTAL REVIEW.

This program is not subject to Executive Order 12372 Intergovernmental Review of Federal Programs.

G. FUNDING RESTRICTIONS.

Cost Principles**.** Costs must be allowable in accordance with the applicable Federal cost principles referenced in 10 CFR Part 600. The cost principles for commercial organization are in FAR Part 31.

Pre-award Costs**.** Recipients may charge to an award resulting from this FOA pre-award costs that were incurred within the ninety (90) calendar-day period immediately preceding the effective date of the award, if the costs are allowable in accordance with the applicable Federal cost principles referenced in 10 CFR Part 600. Recipients must obtain the prior approval of the contracting officer for any pre-award costs that are for periods greater than this 90-day calendar period.

Pre-award costs are incurred at the applicant's risk. DOE is under no obligation to reimburse such costs if for any reason the applicant does not receive an award or if the award is made for a lesser amount than the applicant expected.

H. OTHER SUBMISSION AND REGISTRATION REQUIREMENTS.

1. Where to Submit.

APPLICATIONS MUST BE SUBMITTED THROUGH GRANTS.GOV TO BE CONSIDERED FOR AWARD.

Submit electronic applications through the "Apply for Grants" function at www.Grants.gov. If you have problems completing the registration process or submitting your application, call Grants.gov at 1-800-518-4726 or send an email to support@grants.gov.

2. Registration Process.

You must COMPLETE the one-time registration process (all steps) before you can submit your first application through Grants.gov (See www.grants.gov/GetStarted). We recommend that you start this process at least three weeks before the application due date. It may take 21 days or more to complete the entire process. To register with Grants.gov go to "Get Registered" at http://grants.gov/applicants/get_registered.jsp. Use the Grants.gov Organization Registration Checklist at http://www.grants.gov/assets/OrganizationRegCheck.pdf to guide you through the process. IMPORTANT: During the CCR registration process, you will be asked to designate an E-Business Point of Contact (EBIZ POC). The EBIZ POC must obtain a special password called "Marketing Partner Identification Number" (MPIN). When you have completed the process, you should call the Grants.gov Helpdesk at 1-800-518-4726 to verify that you have completed the final step (i.e., Grants.gov registration).

You cannot submit an application through Grants.gov unless you are registered. Please read the registration requirements carefully and start the process immediately. Remember you have to update your CCR registration annually.

3. Application Receipt Notices

After an application is submitted, the Authorized Organization Representative (AOR) will receive a series of four e-mails. It is extremely important that the AOR watch for and save each of the emails. It may take up to two (2) business days from application submission to receipt of email Number 2. The titles of the four e-mails are:

Number 1 - Grants.gov Submission Receipt Number
Number 2 - Grants.gov Submission Validation Receipt for Application Number
Number 3 - Grants.gov Grantor Agency Retrieval Receipt for Application Number
Number 4 - Grants.gov Agency Tracking Number Assignment for Application Number

PART V - APPLICATION REVIEW INFORMATION

A. CRITERIA

1. Initial Review Criteria.

Prior to a comprehensive merit evaluation, DOE will perform an initial review in accordance with 10 CFR 605.10(b) to determine that (1) the applicant is eligible for the award; (2) the information required by the FOA has been submitted; (3) all mandatory requirements are satisfied; and (4) the proposed project is responsive to the objectives of the FOA. Applications that fail to pass the initial review will not be forwarded for merit review and will be eliminated from further consideration.

2. Merit Review Criteria

Applications will be subjected to scientific merit review (peer review) and will be evaluated against the following evaluation criteria which are listed in descending order of importance codified at 10 CFR 605.10(d). Included within each criterion are specific questions that the merit reviewers will be asked to consider.

1. **Scientific and/or Technical Merit of the Project**
   a. Does the proposed research provide the capability to accelerate scientific discovery in areas of strategic importance to DOE?
   b. Does the research plan contain appropriate performance metrics that will allow progress and contributions to be measured?
   c. What is the likelihood that the applicant can overcome the key challenges and, as warranted, shift research directions in response to promising advances in basic research?

2. **Appropriateness of the Proposed Method or Approach**
   a. Does the proposed research employ state-of-the-art approaches and lower the barriers to effectively use leadership-scale computing resources available to DOE researchers?
   b. Has the applicant identified commonalities in multiple (and different) scientific applications for addressing computational grand challenges and that will enable the Institute to structure its research plan in an efficient manner?
   c. Does the applicant have a process for leveraging basic research advances from Applied Mathematics and Computer Science?
   d. Does the applicant have appropriate plans for outreach to the broader computational science community?

3. **Competency of Applicant's Personnel and Adequacy of Proposed Resources**
   a. Does the applicant have a proven record of success in managing diverse teams of scientific and technical experts and delivering results for advanced computational science research?
   b. Do the applicant's senior/key personnel have a proven record of research and development in the disciplines needed for success in projects of this complexity and magnitude?
   c. Are the roles and intellectual contributions of the SciDAC Institute Director, Principal Investigator(s), and each senior/key personnel adequately described?

4. **Reasonableness and Appropriateness of the Proposed Budget**
   a. Is the applicant's requested budget appropriate?
   b. Does the requested budget support the applicant's specified management structure in a meaningful way?
   c. Does the applicant have a process for reallocating funds to address changing priorities?

The selection official will also consider the following program policy and management factors in the selection process:

a. Potential impact of proposed research activities on SciDAC goals;
b. Relation of the proposed research activities to other research efforts supported by ASCR;
c. Potential for developing synergies with other SciDAC Institutes and Partnerships;
d. Total amount of DOE funds available; and
e. A management plan that addresses the organization, communications, and coordination of the Institutes. This plan should include mitigation strategies for foreseeable risks and explain how the Institute will have sufficient flexibility to adapt to changing priorities, challenges, and resources.

The evaluation process will include program policy factors such as the relevance of the proposed research to the terms of the FOA and the agency's programmatic needs. Note that external peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Both Federal and non-Federal reviewers may be used, and submission of an application constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES.

It is anticipated that selections will be completed by December 31, 2011. Awards will be made in Fiscal Year 2012.

PART VI - AWARD ADMINISTRATION INFORMATION

A. AWARD NOTICES.

1. Notice of Selection.

Selected Applicants Notification: DOE will notify applicants selected for award. This notice of selection is not an authorization to begin performance. (See Part IV.G with respect to the allowability of pre-award costs.)

Non-selected Notification: Organizations whose applications have not been selected will be advised as promptly as possible. This notice will explain why the application was not selected.

2. Notice of Award.

An Assistance Agreement issued by the contracting officer is the authorizing award document. It normally includes, either as an attachment or by reference: 1. Special Terms and Conditions; 2. Applicable program regulations, if any; 3. Application as approved by DOE; 4. DOE assistance regulations at 10 CFR Part 600; 5. National Policy Assurances to be Incorporated as Award Terms; 6. Budget Summary; and 7. Federal Assistance Reporting Checklist, which identifies the reporting requirements.

For grants and cooperative agreements made to universities, non-profits and other entities subject to Title 2 CFR the Award also includes the Research Terms and Conditions located at: http://www.nsf.gov/bfa/dias/policy/rtc/index.jsp.

B. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS.

1. Administrative Requirements.

The administrative requirements for DOE grants and cooperative agreements are contained in 10 CFR 600 and 10 CFR Part 605 (See: http://ecfr.gpoaccess.gov). Grants and cooperative agreements made to universities, non-profits and other entities subject to Title 2 CFR are subject to the Research Terms and Conditions located on the National Science Foundation web site at: http://www.nsf.gov/bfa/dias/policy/rtc/index.jsp.

DUNS and CCR Requirements

Additional administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR, Part 25 (See: http://ecfr.gpoaccess.gov). Prime awardees must keep their data at CCR current. Subawardees at all tiers must obtain DUNS numbers and provide the DUNS to the prime awardee before the subaward can be issued.

Subaward and Executive Reporting

Additional administrative requirements necessary for DOE grants and cooperative agreements to comply with the Federal Funding and Transparency Act of 2006 (FFATA) are contained in 2 CFR, Part 170. (See: http://ecfr.gpoaccess.gov). Prime awardees must register with the new FSRS database and report the required data on their first tier subawardees. Prime awardees must report the executive compensation for their own executives as part of their registration profile in the CCR.

2. Special Terms and Conditions and National Policy Requirements.
The DOE Special Terms and Conditions for Use in Most Grants and Cooperative Agreements are located at: http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms under Award Terms. The National Policy Assurances to be Incorporated as Award Terms are located at: http://www.nsf.gov/bfa/dias/policy/rtc/appc.pdf.

Intellectual Property Provisions.
The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at: http://energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards.

Statement of Substantial Involvement
Either a grant or cooperative agreement may be awarded under this FOA. If the award is a cooperative agreement, the DOE Contract Specialist and DOE Project Officer will negotiate a Statement of Substantial Involvement prior to award.

C. REPORTING.
Reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F4600.2, attached to the award agreement. For a sample Checklist, see http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms.

PART VII - QUESTIONS/AGENCY CONTACTS

A. QUESTIONS

Questions regarding the content of the FOA must be submitted through the FedConnect portal. You must register with FedConnect to respond as an interested party to submit questions, and to view responses to questions. It is recommended that you register as soon after release of the FOA as possible to have the benefit of all responses. More information is available at: https://www.fedconnect.net/FedConnect/PublicPages/FedConnect_Ready_Set_Go.pdf. DOE will try to respond to a question within 3 business days, unless a similar question and answer have already been posted on the website.

Applications submitted through FedConnect will not be accepted.

Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or support@grants.gov. DOE cannot answer these questions.

B. AGENCY CONTACTS:

Technical/Scientific Program Contacts:

Program Manager: Dr. Lucy Nowell, (301) 903-3191
Office of Advanced Scientific Computing Research, SC-21.1

Program Manager: Dr. Steven L. Lee, (301) 903-5710
Office of Advanced Scientific Computing Research, SC-21.1
E-mail: scidac-institutes@ascr.doe.gov

PART VIII - OTHER INFORMATION

A. MODIFICATIONS.

Notices of any modifications to this FOA will be posted on Grants.gov and the FedConnect portal. You can receive an email when a modification or an FOA message is posted by registering with FedConnect as an interested party for this FOA. It is recommended that you register as soon after release of the FOA as possible to ensure you receive timely notice of any modifications or other FOAs. More information is available at http://www.fedconnect.net.

B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE.

DOE reserves the right, without qualification, to reject any or all applications received in response to this FOA and to select any application, in whole or in part, as a basis for negotiation and/or award.

C. COMMITMENT OF PUBLIC FUNDS.

The Contracting Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by other than the Contracting Officer, either explicit or implied, is invalid.

D. PROPRIETARY APPLICATION INFORMATION.

Patentable ideas, trade secrets, proprietary or confidential commercial or financial information, disclosure of which may harm the applicant, should be included in an application only when such information is necessary to convey an understanding of the proposed project. The use and disclosure of such data may be restricted, provided the applicant includes the following legend on the first page of the project narrative and specifies the pages of the application which are to be restricted:

"The data contained in pages _____ of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government's right to use or disclose data obtained without restriction from any source, including the applicant."

To protect such data, each line or paragraph on the pages containing such data must be specifically identified and marked with a legend similar to the following:

"The following contains proprietary information that (name of applicant) requests not be released to persons outside the Government, except for purposes of review and evaluation."

E. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL.

In conducting the merit review evaluation, the Government may seek the advice of qualified non-Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing an application. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

F. INTELLECTUAL PROPERTY DEVELOPED UNDER THIS PROGRAM.

Patent Rights. The government will have certain statutory rights in an invention that is conceived or first actually reduced to practice under a DOE award. 42 U.S.C. 5908 provides that title to such inventions vests in the United States, except where 35 U.S.C. 202 provides otherwise for nonprofit organizations or small business firms. However, the Secretary of Energy may waive all or any part of the rights of the United States subject to certain conditions. (See "Notice of Right to Request Patent Waiver" in paragraph G below.)

Rights in Technical Data. Normally, the government has unlimited rights in technical data created under a DOE agreement. Delivery or third party licensing of proprietary software or data developed solely at private expense will not normally be required except as specifically negotiated in a particular agreement to satisfy DOE's own needs or to insure the commercialization of technology developed under a DOE agreement.

G. NOTICE OF RIGHT TO REQUEST PATENT WAIVER.

Applicants may request a waiver of all or any part of the rights of the United States in inventions conceived or first actually reduced to practice in performance of an agreement as a result of this FOA, in advance of or within 30 days after the effective date of the award. Even if such advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver of the rights of the United States in identified inventions, i.e., individual inventions conceived or first actually reduced to practice in performance of the award. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.12, http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title10/10cfr784_main_02.tpl.

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Domestic small businesses and domestic nonprofit organizations will receive the patent rights clause at 37 CFR 401.14, i.e., the implementation of the Bayh-Dole Act. This clause permits domestic small business and domestic nonprofit organizations to retain title to subject inventions. Therefore, small businesses and nonprofit organizations do not need to request a waiver.

H. NOTICE REGARDING ELIGIBLE/INELIGIBLE ACTIVITIES.

N/A

I. AVAILABILITY OF FUNDS.

Funds are not presently available for this award. The Government's obligation under this award is contingent upon the availability of appropriated funds from which payment for award purposes can be made. No legal liability on the part of the Government for any payment may arise until funds are made available to the Contracting Officer for this award and until the awardee receives notice of such availability, to be confirmed in writing by the Contracting Officer.