

A.37 ADVANCING COLLABORATIVE CONNECTIONS FOR EARTH SYSTEM SCIENCE

May 26, 2011: The budget information in the Summary Table of Key Information in Section 2 has been clarified to specify that this is a per year estimate.

1. Scope of the Program

1.1 Introduction

The primary objective of the Advancing Collaborative Connections for Earth System Science (ACCESS) program is to enhance, extend, and improve existing components of NASA's distributed and heterogeneous data and information systems infrastructure. NASA's Earth science data systems, comprised of both core and community elements, directly support agency science and applied science goals and objectives. ACCESS projects increase the interconnectedness and reuse of key information technology software and techniques underpinning the advancement of Earth science research.

The ACCESS program supports the deployment of data and information capabilities that enable the freer movement of data and information within our distributed environment of providers and users. This often requires the utilization of tools to aid in measurable improvements of Earth science data access and data usability. Awarded projects are expected to augment NASA's heterogeneous data system components by leveraging these proven information technologies in order to rapidly deploy data system capabilities that bridge specific gaps within the agency's Earth science information systems.

The ACCESS program seeks to deploy and reuse existing technological solutions in the support of Earth science data and information needs. The use of mature technologies and practices helps to lower the overall project risk of system deployment, while making these new capabilities readily available to research and applied science communities. Proposals, therefore, offering substantively new IT development efforts or those carrying significant risk due to the immaturity of the technical components are not recommended for submission to this ACCESS solicitation. Awarded project work plans must focus on the use of higher TRL (technology readiness level) technology components (generally TRL 7 and above). The program encourages targeted solutions to current data access and data usability issues by supplying new tools to our Earth science research community.

The ACCESS program, while focusing on information technology deployment, is centered on addressing the existing needs of research and applied science communities. Proposal teams must include both information technology and Earth science experts, and proposals must be tied directly to Earth science and applied science investigations.

This ACCESS solicitation is not a duplicative call for activities described in other ROSES-2011 solicitations, including Earth Science Applications: Disasters, Water Resources, Fires and Wildfires, and SERVIR (Appendices A.33-A.36), Computational Modeling Algorithms and Cyberinfrastructure (Appendix A.40), Earth science research and science data product generation

under the Making Earth System Data Records for Use in Research Environments (MEaSUREs) solicitation (Appendix A.38), and information systems development solicited through the Advanced Information Systems Technology program (Appendix A.41). Proposers should carefully consider planned work in relation to the ACCESS program guidelines before submitting.

1.2 Scope of the Program

NASA's Earth Science Division actively promotes a distributed and heterogeneous data and information system architecture to support the growing demands and needs of a diverse and increasingly IT-sophisticated Earth science user community. Future missions being developed through NASA's Earth Systematic Missions Office will add significantly to the need for robust tools capable of being repurposed and extended to meet new requirements. While some of these Decadal Survey missions will not be in operation for some time, NASA's data systems development in this ACCESS program will continue to be future-looking, so that new missions, once deployed, are supported by robust data systems tools.

Pursuant to these ACCESS program goals, the following areas of interest are being solicited in this 2011 announcement. Proposers should note that data system technologies and tools falling outside these areas will be deemed nonresponsive to this call. In particular, NASA is seeking near-term solutions involving the innovative utilization of mature technologies that leverage current NASA data system capabilities and that are robust, sustainable, extensible, and reusable. Topic areas are:

1.2.1 Improvements in users' ability to efficiently discover, find, access, and readily utilize useful science content from NASA's increasingly large volumes of multimission, multi-instrument Earth science data.

The large volumes of data that will be added to Earth science data systems from Decadal Survey and other future missions will provide science and other researchers a valuable resource. It is imperative, however, that users have the ability to readily discover, search, and access useful science content from these archives in a form that is easily usable by the tools and practices of their communities. Equally important is the ability for users to take full advantage of the Earth Science Division's integrated approach to Earth system science. This includes multiyear, multimission measurements and multiple measurements from satellite constellations (e.g. A-Train, Morning Constellation, and CEOS [Committee on Earth Observation Satellites] Virtual Constellations).

The ACCESS program seeks proposals that result in clear improvements in how users and user communities access and utilize NASA's multimission, multiinstrument data. Examples include, but are not limited to: (1) tools that improve or automate the discovery of heterogeneous data or data tools meeting customizable criteria based on data content, data quality, metadata, production legacy, or other pertinent information across multiple data archives and science domains; (2) tools that improve users' ability to find, access, and only download data meeting customizable criteria and reduce the volume of unwanted data downloaded; (3) tools that help users to efficiently mine useful information from distributed, large volumes of heterogeneous

data; and (4) tools that increase users' ability and efficiency to utilize multiyear measurements spanning multiple missions or multiple measurements from satellite constellations. Proposals must detail how access and usability of Earth science data or tools to the targeted communities will be increased by the proposed technologies.

1.2.2 Tools that improve and expand the accessibility and usability of NASA's Earth science observational data for the modeling and model analysis communities.

Although NASA has made great strides in recent years to bring NASA data and tools to more users, the modeling and model analysis communities still find it difficult to effectively find, understand, and appropriately use Earth science observational data. Although it is recognized that no single tool will meet the needs of all users in the modeling and analysis communities, further progress requires understanding and working within their unique structures.

For example, under the auspices of the Intergovernmental Panel on Climate Change (IPCC), modeling and model analysis communities have come together to coordinate on the next phase of modeling activities, named the Coupled Model Intercomparison Project phase 5 (CMIP5). This effort will lead to the fifth IPCC assessment report on climate change in 2013 (IPCC-AR5). The U.S. Department of Energy-funded Earth System Grid project (ESG), led by the Program for Climate Model Diagnosis and Intercomparison (PCMDI), and in collaboration with its many international partners, was charged with developing and operating the distributed data system infrastructure necessary to manage the output streams from all the participating modeling centers and to enable access and analysis by the global climate research community.

The ACCESS program seeks proposals for tools that increase the utilization of NASA Earth science observational data by modeling and model analysis communities through better discovery, data tools, and dissemination of relevant information; and tools that improve collaborations and information sharing among observational data users, modelers, and model analysis users. Proposers targeting specific modeling and model analysis communities need to demonstrate an understanding of the relevant organizations and their governance.

1.2.3 Other tools and technologies that enhance the accessibility and usability of Earth science data and extend the reach of NASA's Earth Science Division IT investments to new users and communities.

The ACCESS program seeks other innovative approaches to the use of high TRL technologies in proposals that focus on near-term improvements that clearly improve the discovery, access, and usability of NASA Earth science data in targeted research or applied science communities.

1.3 Notable Changes from ROSES ACCESS 2009

Readers should note that the topic areas in ACCESS 2011, in Section 1.2 Scope of the Program, are far broader than in previous ACCESS solicitations. Proposers should also be aware of meaningful changes to Section 2.1, Additional Proposal Requirements and the addition of Section 2.2, Related Information. Important changes have also been made to Sections 2.3, Participation in Earth Science Data Systems Working Groups and 2.4, Persistence of ACCESS Tools.

2. Programmatic Information

2.1 Additional Proposal Requirements

All ACCESS proposals must address the following additional requirements:

- Proposals must clearly identify the Earth science focus area and/or the science application to be served by the technical work proposed.
- Proposals must have a clear objective and work plan for technology execution and deployment.
- The period of award for these projects is two years. Proposal work plans and deliverables described must be limited to two years.
- Work plans must include the current state of practice/application for the tool proposed and identify the improvements or augmentations that will result from the two year ACCESS award.
- If the proposal is leveraging or extending past work funded by the ACCESS program, the relevancy and appropriateness to this ACCESS solicitation must be made clear.
- Proposals must address both the effectiveness and appropriateness of the total life-cycle development, including maintenance costs.
- Proposals submitted in response to this solicitation must provide a reasonable operations concept for continuance of the tools developed for the ACCESS program beyond ACCESS funding (see 2.4 below).

2.2 Related Information

All proposers should review the Earth Science Data Information Policy and the Data Rights and Related Issues documents (<http://science.nasa.gov/earth-science/earth-science-data/data-information-policy/>). Note that the Rights in Data clause was created for NASA's Earth Science Data Cooperative Agreements and *replaces* the standard Rights in Data clause (1260.30) of the "NASA Grant and Cooperative Agreement Handbook." Where applicable, work plans must account for the future state of information system software rights.

Proposers should understand key core and community components of NASA's Earth science data systems to leverage them appropriately. These components include the distributed processing and data centers that process, archive, and distribute data products; and the EOS Clearinghouse (ECHO; <http://www.echo.nasa.gov>) that provides directory and inventory

capabilities for all data via a Web search client. An overview of EOSDIS and its components is available at <http://esdis.eosdis.nasa.gov/eosdis/overview.html>.

Definitions of Technology Readiness Levels that should be used in assessing technologies are available at http://esto.nasa.gov/files/TRL_definitions.pdf.

Proposers should also become familiar with NASA's Earth Science Data Systems Program and the data standards process (<http://science.nasa.gov/earth-science/earth-science-data/>).

2.3 Participation in Earth Science Data Systems Working Groups

Proposals selected by the ACCESS program are required to have representation on at least one of the Earth Science Data Systems Working Groups (ESDSWG). Proposals should include a brief statement detailing which of the working groups the team will be participating in and what expertise the member(s) will bring.

Proposals must budget a quarter-time (0.25) FTE for working group activities (see <https://esdswg.eosdis.nasa.gov> for additional information). Proposals must include, or otherwise address, a small travel budget for the annual ESDSWG joint meeting. Participation on a working group is an ACCESS program requirement and not subject to project waivers or negotiation.

2.4 Persistence of ACCESS Tools

The ACCESS program awards are intended to help bear the costs of technological deployment of needed tools and not be an ongoing funding source for the operations and maintenance of these tools. Proposals must address the tool life cycle and means for continued operation once ACCESS deployment resources end.

NASA recognizes that the use of COTS (commercial-off-the-shelf) and GOTS (Government-off-the-shelf) software, software developed through open source licensing, and other "freeware," are of equal consideration for use in ACCESS projects, as appropriate to the particular tool. While it is not always possible to plan with certainty the life cycle of these technologies, proposers must understand and address the risks and benefits of the likely scenario and make a case for meeting project objectives and the uptake of project-developed tools by the communities they are intended to serve.

2.5 Award Type and Funding

The funding vehicle for any award under this solicitation will be a Cooperative Agreement (CA). Proposers should make themselves aware of the differences between a CA and a grant. For additional information proposers can review the *NASA Grant and Cooperative Agreement Handbook* (http://prod.nais.nasa.gov/pub/pub_library/grcover.htm). Proposers are also encouraged to discuss this form of agreement with their institutions prior to submission of an ACCESS proposal.

This solicitation intends to provide approximately \$3.5M per year for approximately ten to fifteen funded projects for a two-year project period of performance. All work funded under this ACCESS solicitation must be completed within two years from the CA start date. Approximately \$200K - \$500K per year will be provided for each ACCESS award. No awarded budget will exceed \$500K per year (including NASA civil servant salaries). Proposal budgets are expected to vary commensurate with the scale and scope of the activities proposed, however, return on investment and cost reasonableness are key evaluation criteria proposers should be cognizant of when determining proposal costs. Given the two-year development period, we strongly encourage narrowly focused, lower budget proposals.

2.6 Proposal Evaluation

Proposals submitted to NASA in response to this solicitation will be evaluated with respect to the criteria specified in Section C.2 of the *NASA Guidebook for Proposers*. In addition to the evaluation factors given in the *NASA Guidebook for Proposers*, the intrinsic merit of a proposal shall include the following factors:

- The extent to which the proposal addresses the additional proposal requirements given in Section 2.1; and
- The extent to which the proposed tools will persist as described in Section 2.4.

In addition to the evaluation factors given in the *NASA Guidebook for Proposers*, the cost realism and reasonableness of a proposal shall include the following factor:

- The effectiveness of the total life-cycle cost of development and maintenance.

3. Summary of Key Information

Expected total program budget for new awards	~ \$3.5M per year [Clarified May 26, 2011]
Number of new awards pending adequate proposals of merit	~10-15
Maximum duration of awards	2 years
Supplemental EPO Eligibility	Yes, for awards >1 year; see Appendices E.5 and E.6
Due date for Notice of Intent to propose (NOI)	See Tables 2 and 3 in the <i>Summary of Solicitation</i> of this NRA.
Due date for proposals	See Tables 2 and 3 in the <i>ROSES Summary of Solicitation</i> .
Planning date for start of investigation	6 months after proposal due date
Page limit for the central Science-Technical-Management section of proposal	15 pp; see also Chapter 2 of the <i>NASA Guidebook for Proposers</i>
Relevance to NASA	This program is relevant to the Earth science strategic goals and subgoals in NASA's <i>Strategic Plan</i> ; see Table 1 and the references therein. Proposals that are relevant to this program are, by definition, relevant to NASA.

General information and overview of this solicitation	See the <i>Summary of Solicitation</i> of this NRA.
Detailed instructions for the preparation and submission of proposals	See the <i>NASA Guidebook for Proposers</i> at http://www.hq.nasa.gov/office/procurement/nraguidebook/
Submission medium	Electronic proposal submission is required; no hardcopy is required. See also Section IV in the <i>Summary of Solicitation</i> of this NRA and Chapter 3 of the <i>NASA Guidebook for Proposers</i> .
Web site for submission of proposal via NSPIRES	http://nspires.nasaprs.com/ (help desk available at nspires-help@nasaprs.com or (202) 479-9376)
Web site for submission of proposals via Grants.gov	http://grants.gov (help desk available at support@grants.gov or (800) 518-4726)
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