

A.41 MAKING EARTH SYSTEM DATA RECORDS FOR USE IN RESEARCH ENVIRONMENTS

1. Scope of Program

The overall objective of MEaSUREs solicitations is to select projects providing Earth science data products and services driven by NASA's Earth science goals. MEaSUREs may include infusion or deployment of applicable science tools that contribute to data product quality improvement, consistency, merging or fusion, or understanding.

1.1 Overview

The Earth Science Division (ESD) uses NASA's unique capabilities in space to study the fundamental Earth processes that power climate, weather, and natural hazards, and the impact of those processes on the quality of life. In pursuit of its objectives in Earth science research, NASA is generating Earth system data of unprecedented quality and quantity and developing data processing and modeling capabilities to transform these data into products, information, and, ultimately, new knowledge of our planet. NASA Earth science data, data products and data processing algorithms are stored in archives at centers across the United States and linked by the Internet for data access and distribution.

A major need stated by the NASA Earth science research strategy is to develop long-term, consistent, and calibrated data and products that are valid across multiple missions and satellite sensors.

Data products created from multiple instruments, and from "data fusion," remain a challenge, and full utilization of complementary satellite data remains an elusive goal. NASA synergistic packages intended for creation of products, e.g. AIRS/AMSU, provide a guide for further innovative data products to be introduced. Here "data fusion" could be Low level fusion, the combining of several sources of raw data to produce new raw data, or data integration, the combining of diverse data sets into a unified data set which includes all of the data points and time steps from the input data sets. Sophisticated understanding of the contributing instruments' characterization and correct application of the various contributing data must be performed for such records to achieve the expectation that fused data is more informative and synthetic than the original inputs.

NASA is currently developing new missions to be launched in this decade. Records that provide precursor products that begin to baseline geophysical parameters that will be produced from these satellites would be valuable to NASA's Earth science research strategy.

NASA's Earth Science Division has an unprecedented number of missions currently flying. Data product developers have matured mission instrument products through refinement of instrument cal/val and algorithms. Accordingly, ESD is increasingly able to focus research and data production on measurement-based products, beyond single mission instrument products. For creating these basic records, a science measurement focus brings together expertise in multiple instrument characterization and calibration, data processing, science-based product generation and distribution, science tools and interactive relationships with the broader science community.

Projects selected through this solicitation will work to afford a solution for utilization of NASA assets and capabilities by the following:

- providing or adding to mature data records needed for NASA Earth System research, and potentially product science tools and services capabilities;
- applying ESD principles regarding community involvement, product life cycle planning, and standards and interfaces for interoperability and exchange of data and information;
- supporting ongoing data system evolution efforts through participation in one or more Earth Science Working Groups, which include Standards and Interfaces, Technology Infusion, Architecture and Reuse, and Metrics Planning and Reporting.

1.2. Types of Proposals

This MEaSURES call continues the 2006 MEaSURES Program focus on these particular Earth science research measurement needs, and the creation of Earth System Data Records (ESDRs), including Climate Data Records (CDRs). An ESDR is defined as a unified and coherent set of observations of a given parameter of the Earth system, which is optimized to meet specific requirements in addressing science questions. These data records are critical to understanding Earth System processes, are critical to assessing variability, long-term trends, and change in the Earth System and provide input and validation means to modeling efforts.

Selected MEaSURES projects will be focused on product generation, availability, and utility. Maturity of algorithm and cal/val activity research is a prerequisite for selection as a MEaSURES project to embark on large-scale data production.

2. Programmatic Information

Awards will commence with Fiscal Year 2013 funds.

2.1 Proposal Submission and Evaluation

In addition to the evaluation criteria given in *NASA Guidebook for Proposers*, these MEaSURES proposals must address these additional factors:

- Identify the Earth Science research need or use for the ESDR/CDR. Proposers should cite documentation of key measurement needs found in NASA or NASA-participating (e.g. U.S. Global Change Research Program, Group on Earth Observations (GEO) Reports) related strategic plans, documents, roadmaps, or other materials.
- Document ESDR/CDR community establishment and maturity level, citing established cal/val, peer reviewed publications for algorithms, and product quality and usage summaries.
- Identify all challenges in the development and production of the proposed ESDR/CDR and describe the effort required. Characterize uncertainties and quantify errors associated with the proposed ESDRs.

- The period of award for these projects is up to five years. Proposal plans and deliverables described must state the length of effort and provide milestones and deliverables within the timeline. Five year proposals must be fully justified.

2.2 Other Requirements

All MEaSURES projects will meet the following requirements:

- Maintain a public WWW-compliant presence.
- Data and information shall be publicly available, preferably via Internet transfer. A tailored, alternate *Data Rights* section will be applied to resultant Cooperative Agreement (CA), under which scientific data and scientific software (software used for processing raw Earth Observation remote sensing instrument data into scientific data and products) will be exchanged without restriction as to its disclosure, use, or duplication.
- Cooperative Agreement project management will seek community scrutiny and review of product quality and acceptability.

In addition, proposals selected by the MEaSURES Program will be asked to have representation on one or more Earth Science Data System Working Groups (DSWGs). MEaSURES proposals must include to which DSWG(s) they wish to have representation. Proposers should budget a quarter time (0.25) FTE and adequate travel budget for these activities (see <http://earthdata.nasa.gov/our-community/esdswg> for additional information).

2.3 Award Type and Funding

The vehicle for projects selected through this solicitation will be a Cooperative Agreement (CA). Proposers should be aware of the differences between a CA and other vehicles such as grants. See NASA's *Guidebook for Proposers* for guidance.

2.4 Relationship to Other NASA Program Elements

NASA will not consider any proposal to include data from the NPP satellite instruments in response to this 2012 MEaSURES solicitation, given the current state of evaluation of NPP instruments. Research on evaluation of NPP instruments and use of those instruments' data to continue NASA ESDRs from EOS instruments is being conducted by the NASA NPP Science Team. All interested parties are encouraged to participate in NASA community evaluation through this effort.

Two recent solicitations have resulted in NASA investigations that have bearing to the selection of future MEaSURES ESDR development and production. These are Projects selected under Earth Science Data Records Uncertainty Analysis (ROSES-10) and Satellite Calibration Interconsistency Studies (ROSES-11). Proposers are advised to review the available abstracts and results where available of these selected Projects, as well as the MEaSURES Projects

awarded under ROSES-06, to ensure awareness of all ongoing as well as completing work done in this area (<http://earthdata.nasa.gov/our-community/community-data-system-programs>).

Any proposer whose project would require high performance computing should refer to the *ROSES Summary of Solicitation*, Section I(d), "NASA-provided High-End Computing Resources." This section describes the opportunity for successful proposers to the MEaSUREs program to apply for computing time on either of two NASA computing facilities, at NASA Goddard Space Flight Center's Computational and Information Sciences and Technology Office or at Ames Research Center's Advanced Supercomputing Division.

MEaSUREs does not solicit proposals for systems and information technology. Information technology deployment of data and information systems and services and tools that enhance NASA's data and information systems infrastructure, increase the interconnection of services for research, and enable freer movement of data and information within the distributed system of users and providers are invited to apply to the Advancing Collaborative Connections for Earth System Science (ACCESS) Program.

MEaSUREs does not solicit proposals for science data products algorithm development or refinement or for cal/val activities. These research activities are solicited through other Earth Science Research Program opportunities, most recently ROSES-09, The Science of TERRA and AQUA.

3. Summary of Key Information

Expected annual program budget for new awards	~ \$12M/year [corrected 2/27/2012]
Number of new awards pending adequate proposals of merit	~ 12 - 20
Maximum duration of awards	5 years
Due date for Notice of Intent to propose (NOI)	See Tables 2 and 3 in the <i>ROSES Summary of Solicitation</i> .
Due date for proposals	See Tables 2 and 3 in the <i>ROSES Summary of Solicitation</i> .
Planning date for start of new investigation	January 1, 2013
Page limit for the central Science-Technical-Management section of proposal	20 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. See the Alternate Data Rights to be used in Cooperative Agreements for this Program at:

	http://science.nasa.gov/earth-science/earth-science-data/data-information-policy/data-rights-related-issues/
Detailed instructions for the preparation and submission of proposals	See the <i>NASA Guidebook for Proposers Responding to a NASA Research Announcement</i> at http://www.hq.nasa.gov/office/procurement/nraguidebook/ .
Submission medium	Electronic proposal submission is required; no hard copy 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 proposal via Grants.gov	http://grants.gov (help desk available at support@grants.gov or (800) 518-4726)
Funding opportunity number for downloading an application package from Grants.gov	NNH12ZDA001N-MEASURES
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