

**Program Announcement
To DOE National Laboratories
LAB 06-20**

***Atmospheric Radiation Measurement (ARM)
Aerial Vehicles Program (AAVP)***

SUMMARY: The Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving peer-reviewable Field Work Proposals (FWPs) for providing piloted and/or unpiloted aerial vehicles as instrument platforms for measuring atmospheric properties and processes. Aerial vehicle platforms and the required instrumentation that would be made available under contract or lease arrangements between the Department of Energy (DOE) laboratory selected through this competitive solicitation and one or more private companies will be part of the Atmospheric Radiation Measurement (ARM) Program infrastructure. The ARM infrastructure supports the Department's Climate Change Research Program, the U.S. Global Change Research Program, and the Administration's goals to understand the radiation and cloud processes associated with climate change.

BACKGROUND:

Program Objective

The ARM Program was initiated to improve understanding of the interactions between clouds and atmospheric radiative fluxes, and then to capture that knowledge in improved climate models. The focus of the ARM infrastructure is on long-term ground-based measurements of solar and thermal infrared radiative fluxes at the Earth's surface, and all of the atmospheric quantities such as clouds, water vapor, and aerosols that affect those fluxes. BER has designated the ARM infrastructure resources as a national user facility, the ARM Climate Research Facility (ACRF). The ACRF includes three fixed sites located in the Southern Great Plains (SGP), the North Slope of Alaska (NSA), and the Tropical Western Pacific (TWP) and also includes the ARM Mobile Facility (AMF) that may be deployed to different locations for 6 months to a year. The ARM Aerial Vehicle Program (AAVP) will be part of the ARM Climate Research Facility, beginning in FY 2007.

The AAVP will provide the aircraft measurements that complement the ACRF ground-based measurements. Since the AAVP is part of the ARM facility, it will be expected to meet aircraft needs that are requested in proposals for use of the ACRF. These requests may include providing airborne measurements during intensive observational periods (IOPs) over one or more of the three stationary sites or at the location of the mobile facility. Airborne measurements may also be requested for routine flights over the stationary sites. All requests for AAVP support will be conducted through the ACRF Field Campaign request process (See http://www.arm.gov/acrf/submit_proposals.stm). Final approval of all AAVP campaigns will be made by the DOE AAVP Program Manager.

The program will not support aircraft purchases or development.

DATES: Formal applications submitted in response to this Announcement must be received by July 31, 2006, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2007. The applicants are asked to submit an electronic copy of the abstract in ASCII text format by 4:30 pm, Eastern Time, August 1, 2006, to: Rick.petty@science.doe.gov. The abstract should include the following information: PI and co-PIs, their institutions, and a brief summary of aircraft platforms and their measurement capabilities that would be provided.

Full proposals submitted in response to this Announcement must be submitted to the DOE Electronic Proposal Management Application (ePMA) system (<https://epma.doe.gov>) no later than 8:00 p.m., Eastern Time, July 31, 2006, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2007. It is important that the entire peer reviewable proposal be submitted to the ePMA system as a single PDF file attachment.

Please see the "Addresses" section below for further instructions on the methods of submission for the full proposal.

ADDRESSES: A complete formal FWP in a single Portable Document Format (PDF) file must be submitted through the DOE ePMA system (<https://epma.doe.gov>) as an attachment. To identify that the FWP is responding to this program announcement, please fill in the following fields in the "ePMA Create Proposal Admin Information" screen as shown:

Proposal Short Name:

Fiscal Year:

Proposal Reason:

Program Announcement Number: Lab 06-20 *

Program announcement Title: Atmospheric Radiation Measurement (ARM) Aerial Vehicles Program (AAVP) Program Announcement *

Proposal Purpose:

Estimated Proposal Begin Date:

HQ Program Manager Organization:

* Please use the wording shown when filling in these fields to identify that the FWP is responding to this Program Announcement.

In order to expedite the review process, please submit a CD and two copies of the proposal and FWP using the following, by U.S. Postal Service Express Mail, any commercial mail delivery service, or when hand-carried to:

Karen Carlson-Brown
U.S. Department of Energy
Office of Biological and Environmental Research, SC-23.3/GTN
19901 Germantown Road
Germantown, MD 20874-1290
ATTN: Program Announcement LAB 06-20

In the proposal package, include an extra copy of the one-page abstract.

FOR FURTHER INFORMATION CONTACT: Rickey Petty, Climate Change Research Division, SC-23.3/Germantown Building, Office of Biological and Environmental Research, Office of Science, U.S. Department of Energy, 1000 Independence Ave., SW, Washington, D.C. 20585-1290, telephone: (301) 903-5548, e-mail: rick.petty@science.doe.gov, fax: (301) 903-8519. Communications related to the formal proposal should use "Program Announcement LAB 06-20 FORMAL" in the subject line.

The full text of Program Announcement LAB 06-20 is available via the Internet using the following web site address: <http://www.science.doe.gov/grants/grants.html>.

SUPPLEMENTARY INFORMATION: The scope of the program to be supported under this notice is to provide aircraft platforms that will measure radiation and cloud properties, processes and their interaction with atmospheric radiative fluxes.

Program Funding

It is anticipated that an award will be granted in FY 2007 in the form of start-up funds possibly on the order of \$1M. The start-up funds will include the establishing of contracts or subcontracts, and infrastructure necessary for full-time operation of the AAVP in the sequential years. Thereafter, funding levels in sequential years are expected to be approximately \$2.7M, depending on the availability of funds.

Technical Objectives

The focus of the AAVP is to provide airborne measurements needed to answer questions that have been identified by the ARM Science Team and external users of the ACRF. A long-term commitment of the AAVP is the acquisition of routine, long-term observations using aerial vehicle platforms including those flying at altitudes above the tropopause at up to 70,000 feet. Thus, the AAVP will support the application of miniaturized instruments for remote sensing and *in situ* observations of cloud, aerosol and radiative properties. The support will include both routine observations and Intensive Operations Period (IOP) participation. Both data collection strategies are intended to contribute to the understanding of clouds, aerosols, radiation and the climate system. The scientific objectives of each measurement campaign will establish the requirements for the platform and the *in situ* and remote sensing instruments. The aircraft may be either piloted or unpiloted platforms. The AAVP will be required to submit all data to the ARM archive in a Network Common Data Form (NetCDF) format with data quality flags and metadata. This requires converting the data to the equivalent of the ARM b1 data level.

The geographic coverage of these measurements includes, but is not limited to the three fixed ARM sites (the Southern Great Plains, North Slope of Alaska, and the Tropical Western Pacific). AAVP support may also be requested in conjunction with deployments of the ARM Mobile Facility (AMF). AAVP support may also be requested for IOPs in regions where measurements can't be obtained remotely with either the ARM fixed sites or the AMF, such as over the Arctic Ocean or over areas of the ocean far removed from land sites. Measurements over such locations

would be especially useful in extending the range of science questions that the ARM program can address.

T.1 Routine Observations of Cloud, Aerosol and Radiative Properties

The intent is to have an AAVP that is capable of making routine airborne observations of cloud properties in a routine operational phase as part of the ACRF. This is consistent with ARM's operational strategy which emphasizes long-term ground- and aircraft-based measurements of cloud and atmospheric properties and processes. Considerable synergy would be gained by having both kinds of measurements on a more routine basis, permitting statistical studies of airborne *in situ* and remote sensing data. Current studies of airborne data concentrate mainly on case studies and to some degree statistical analysis of limited data sets. Additionally, the desired measurements will infer the platform desired during these observations. (Note: for more information, see <http://www.atmos.uiuc.edu/~mcfarq/avpp.whitepaperoverview.pdf>)

The ARM program is currently making routine twice-weekly observations of aerosols and carbon fluxes over the SGP site. This is making large contributions to the understanding of the vertical distributions of the concentrations, size distributions, compositions and single-scattering radiative properties of aerosols and their variability. Routine observations by the AVPP will complement this existing ACRF capability.

T.2 Participation in IOPs

Although the ARM program has embraced the philosophy of making long-term continuous ground-based measurements of cloud and atmospheric properties at fixed and mobile facilities around the world, these measurements need to be supplemented with focused sets of airborne and other observations. When an IOP is approved, the AAVP will search for the best platform and combination of instruments available to meet the science goals of the project.

Both piloted and unpiloted platforms may be used for this purpose, depending on the scientific objective, location, FAA and DOE regulations and instrument requirements. The balance between routine measurements and IOPs will be determined by the ARM Science Team, the ACRF, and the AVPP Team.

T.3 Measurement Needs

The ARM Science Team and the AAVP Team will play a critical role in identifying instrument priorities and in determining the order in which new instruments should be acquired. As part of the instrument program, it is important to identify both the long-term and short-term measurement needs of the program. General classes of measurements identified for use in the AAVP are: aerosol measurements, *in situ* cloud microphysics, and atmospheric state parameters.

Instrumentation for addressing these needs will be leased or purchased as required. The instruments that have been purchased with DOE funds for the ARM UAV program, will be available for use by the AAVP.

Submission Information

The following is a list of essential items that a proposal must contain:

1. Field Work Proposal (FWP) Format (Reference DOE Order 5700.7C) - completed and signed by appropriate officials.

2. Proposal Cover Page

3. Table of Contents

4. Budget Page(s) (Form DOE F 4620.1) Complete a Budget Page for each of the three years. It is not necessary to submit a summary budget for the entire multi-year period.

5. Other Project Information

a. A one-page abstract (on a page by itself). The abstract should include: name of the laboratory; name of the principal investigator and the principal investigator's email address and phone number; name of the co-principal investigator (if any) and the co-principal investigator's email address and phone number; a summary of the project narrative, including the technical qualifications of the principal investigator.

b. Project Narrative: A detailed description of the proposed management of the AAVP project is required. The major part of the narrative should be devoted to a description and justification of the proposed activities, including details of the methods and approaches to be used. It should indicate which project personnel will be responsible for which activities. The following two issues must be addressed:

o **Technical Coordination** - The proposal should address the structure and processes that will be used to coordinate AVPP activities with other parts of the ARM infrastructure, the ARM science team, and the general scientific community. This component should address the development of implementation plans for measurements needed for both the routine and IOP flights. The proposal should address capabilities in providing various platforms to accommodate measurements required by the scientific objectives of routine and IOP measurements, and the integration of instrumentation. The proposal should address flight coordination **of aircraft and ground-based measurements during IOPs.**

o **Management Issues** - **The proposal should address** management of operations; mechanisms for establishing contracts for aircraft and instrumentation, ensuring the delivery of data from deployed instruments, and acquiring the necessary FAA clearances, as well as within guidelines of the DOE Office of Aviation Management general orders.

c. Biographical Sketches: Detailed information about the background and experience of the principal investigator and co-principal investigator (if any). Biographical sketches are limited to two pages for the principal investigator, and two pages for the co-principal investigator (if any).

d. Facilities and Resources: Include information on the experience of the applicant's organization, its facilities, and resources that would be relevant to successful operation of the project.

e. Statement of all current and pending support for the principal investigator and co-principal investigator (if any), including the time devoted to each project by the principal investigator and co-principal investigator (if any).

Merit Review Evaluation Criteria

1. Technical Merit: Proposal (includes capabilities such as research potential/development/purchase of instrumentation, technical support of experiments, instrument calibration maintenance).

2. Appropriateness: Proposed method or approach including interfacing with the ARM Infrastructure, Intensive Operations Period participants and other scientific users. Data reduction and quality control measures are also included.

3. Management Issues: Management of operations and mechanisms for establishing contracts for aircraft and instrumentation, ensuring the delivery of data from deployed instruments, and acquiring the necessary FAA and DOE clearances.

4. Competency: Applicant's Personnel and Adequacy of Proposed Resources.

5. Occupational Safety: Provision of safeguards that ensure the safety of personnel associated with AAVP activities.

6. Reasonableness and Appropriateness: Proposed Budget.

The instructions and format described below should be followed. You must reference Program Announcement LAB 06-20 on all submissions and inquiries about this program.

OFFICE OF SCIENCE GUIDE FOR PREPARATION OF SCIENTIFIC/TECHNICAL PROPOSALS TO BE SUBMITTED BY NATIONAL LABORATORIES

Proposals from National Laboratories submitted to the Office of Science (SC) as a result of this program announcement will follow the Department of Energy Field Work Proposal process with additional information requested to allow for scientific/technical merit review. The following guidelines for content and format are intended to facilitate an understanding of the requirements

necessary for SC to conduct a merit review of a proposal. Please follow the guidelines carefully, as deviations could be cause for declination of a proposal without merit review.

1. Evaluation Criteria

Proposals will be subjected to formal merit review (peer review) and will be evaluated against the following criteria which are listed in descending order of importance:

- 1. Technical Merit:** Proposal (includes capabilities such as research potential/development/purchase of instrumentation, technical support of experiments, instrument calibration maintenance).
- 2. Appropriateness:** Proposed method or approach including interfacing with the ARM Infrastructure, Intensive Operations Period participants and other scientific users. Data reduction and quality control measures are also included.
- 3. Management Issues:** Management of operations and mechanisms for establishing contracts for aircraft and instrumentation, ensuring the delivery of data from deployed instruments, and acquiring the necessary FAA and DOE clearances.
- 4. Competency:** Applicant's Personnel and Adequacy of Proposed Resources.
- 5. Occupational Safety:** Provision of safeguards that ensure the safety of personnel associated with AAVP activities.
- 6. Reasonableness and Appropriateness:** Proposed Budget.

The evaluation process will include program policy factors such as the relevance of the proposed research to the terms of the announcement and the Department's programmatic needs. External peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Non-federal reviewers may be used, and submission of a proposal constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

2. Summary of Proposal Contents

- Field Work Proposal (FWP) Format (Reference DOE Order 5700.7C) (DOE ONLY)
- Proposal Cover Page
- Table of Contents
- Budget (DOE Form 4620.1) and Budget Explanation
- Abstract (one page)
- Narrative (main technical portion of the proposal, including background/introduction, proposed research and methods, timetable of activities, and responsibilities of key project personnel)
- Biographical Sketch(es)
- Description of Facilities and Resources
- Statement of all Current and Pending Support

- Appendix (optional)

2.1 Number of Copies to Submit

A complete formal FWP in a single Portable Document Format (PDF) file must be submitted through the DOE ePMA system (<https://epma.doe.gov>) as an attachment. To identify that the FWP is responding to this program announcement, please fill in the following fields in the "ePMA Create Proposal Admin Information" screen as shown:

Proposal Short Name:

Fiscal Year:

Proposal Reason:

Program Announcement Number: Lab 06-20 *

Program announcement Title: Atmospheric Radiation Measurement (ARM) Aerial Vehicles Program (AAVP) Program Announcement *

Proposal Purpose:

Estimated Proposal Begin Date:

HQ Program Manager Organization:

* Please use the wording shown when filling in these fields to identify that the FWP is responding to this Program Announcement.

In order to expedite the review process, please submit a CD and two copies of the proposal and FWP using the following, by U.S. Postal Service Express Mail, any commercial mail delivery service, or when hand-carried to:

Karen Carlson-Brown
U.S. Department of Energy
Office of Biological and Environmental Research, SC-23.3/GTN
19901 Germantown Road
Germantown, MD 20874-1290
ATTN: Program Announcement LAB 06-20

3. Detailed Contents of the Proposal

Adherence to type size and line spacing requirements is necessary for several reasons. No researcher should have the advantage, or by using small type, of providing more text in their proposals. Small type may also make it difficult for reviewers to read the proposal. Proposals must have 1-inch margins at the top, bottom, and on each side. Type sizes must be 11 point. Line spacing is at the discretion of the researcher but there must be no more than 6 lines per vertical inch of text. Pages should be standard 8 1/2" x 11" (or metric A4, i.e., 210 mm x 297 mm).

3.1 Field Work Proposal Format (Reference DOE Order 5700.7C)

The Field Work Proposal (FWP) is to be prepared and submitted consistent with policies of the investigator's laboratory and the local DOE Operations Office. Additional information is also requested to allow for scientific/technical merit review.

Laboratories may submit proposals directly to the SC Program office listed above. A copy should also be provided to the appropriate DOE operations office.

3.2 Proposal Cover Page

The following proposal cover page information may be placed on plain paper. No form is required.

Title of proposed project
SC Program announcement title
Name of laboratory
Name of principal investigator (PI)
Position title of PI
Mailing address of PI
Telephone of PI
Fax number of PI
Electronic mail address of PI
Name of official signing for laboratory*
Title of official
Fax number of official
Telephone of official
Electronic mail address of official
Requested funding for each year; total request
Use of human subjects in proposed project:
 If activities involving human subjects are not planned at any time during the proposed project period, state "No"; otherwise state "Yes", provide the IRB Approval date and Assurance of Compliance Number and include all necessary information with the proposal should human subjects be involved.
Use of vertebrate animals in proposed project:
 If activities involving vertebrate animals are not planned at any time during this project, state "No"; otherwise state "Yes" and provide the IACUC Approval date and Animal Welfare Assurance number from NIH and include all necessary information with the proposal.
Signature of PI, date of signature
Signature of official, date of signature*

*The signature certifies that personnel and facilities are available as stated in the proposal, if the project is funded.

3.3 Table of Contents

Provide the initial page number for each of the sections of the proposal. Number pages consecutively at the bottom of each page throughout the proposal. Start each major section at the top of a new page. Do not use unnumbered pages and do not use suffices, such as 5a, 5b.

3.4 Budget and Budget Explanation

A detailed budget is required for the entire project period and for each fiscal year. It is preferred that DOE's budget page, Form 4620.1 be used for providing budget information*. Modifications of categories are permissible to comply with institutional practices, for example with regard to overhead costs.

A written justification of each budget item is to follow the budget pages. For personnel this should take the form of a one-sentence statement of the role of the person in the project. Provide a detailed justification of the need for each item of permanent equipment. Explain each of the other direct costs in sufficient detail for reviewers to be able to judge the appropriateness of the amount requested.

Further instructions regarding the budget are given in section 4 of this guide.

* Form 4620.1 is available at web site: <http://www.science.doe.gov/grants/Forms-E.html>

3.5 Abstract

Provide an abstract of less than 400 words. Give the project objectives (in broad scientific terms), the approach to be used, and what the research is intended to accomplish. State the hypotheses to be tested (if any). At the top of the abstract give the project title, names of all the investigators and their institutions, and contact information for the principal investigator, including e-mail address.

3.6 Narrative (main technical portion of the proposal, including background/introduction, proposed research and methods, timetable of activities, and responsibilities of key project personnel).

The 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 methods 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.

If any portion of the project is to be done in collaboration with another institution (or institutions), provide information on the institution(s) and what part of the project it will carry out. Further information on any such arrangements is to be given in the sections "Budget and Budget Explanation", "Biographical Sketches", and "Description of Facilities and Resources".

3.7 Biographical Sketches

This information is required for senior personnel at the institution submitting the proposal and at all subcontracting institutions (if any). The biographical sketch is limited to a maximum of **two pages** for each investigator.

To assist in the identification of potential conflicts of interest or bias in the selection of reviewers, the following information **must be provided in each biographical sketch**.

Collaborators and Co-editors: A list of all persons in alphabetical order (including their current organizational affiliations) who are currently, or who have been, collaborators or co-authors with the investigator on a research project, book or book article, report, abstract, or paper during the 48 months preceding the submission of the proposal. Also include those individuals who are currently or have been co-editors of a special issue of a journal, compendium, or conference proceedings during the 24 months preceding the submission of the proposal. If there are no collaborators or co-editors to report, this should be so indicated.

Graduate and Postdoctoral Advisors and Advisees: A list of the names of the individual's own graduate advisor(s) and principal postdoctoral sponsor(s), and their current organizational affiliations. A list of the names of the individual's graduate students and postdoctoral associates during the past five years, and their current organizational affiliations.

3.8 Description of Facilities and Resources

Facilities to be used for the conduct of the proposed research should be briefly described. Indicate the pertinent capabilities of the institution, including support facilities (such as machine shops), that will be used during the project. List the most important equipment items already available for the project and their pertinent capabilities. Include this information for each subcontracting institution (if any).

3.9 Statement of all Current and Pending Support

Other support is defined as all financial resources, whether Federal, non-Federal, commercial, or institutional, available in direct support of an individual's research endeavors. Information on active and pending other support is required for all senior personnel, including investigators at collaborating institutions to be funded by a subcontract. For each item of other support, give the organization or agency, inclusive dates of the project or proposed project, annual funding, and level of effort (months per year or percentage of the year) devoted to the project.

3.10 Appendix (optional)

Information not easily accessible to a reviewer may be included in an appendix. Reviewers are not required to consider information in an appendix, and reviewers may not have time to read extensive appendix materials with the same care they would use with the proposal proper. The appendix may contain the following items: up to five publications, manuscripts accepted for publication, abstracts, patents, or other printed materials directly relevant to this project, but not

generally available to the scientific community; and letters from investigators at other institutions stating their agreement to participate in the project (do not include letters of endorsement of the project).

4. Detailed Instructions for the Budget

(DOE Form 4620.1 "Budget Page" may be used).

4.1 Salaries and Wages

List the names of the principal investigator and other key personnel and the estimated number of person-months for which DOE funding is requested. Proposers should list the number of postdoctoral associates and other professional positions included in the proposal and indicate the number of full-time-equivalent (FTE) person-months and rate of pay (hourly, monthly or annually). For graduate and undergraduate students and all other personnel categories such as secretarial, clerical, technical, etc., show the total number of people needed in each job title and total salaries needed. Salaries requested must be consistent with the institution's regular practices. The budget explanation should define concisely the role of each position in the overall project.

4.2 Equipment

DOE defines equipment as "an item of tangible personal property that has a useful life of more than two years and an acquisition cost of \$25,000 or more." Special purpose equipment means equipment which is used only for research, scientific or other technical activities. Items of needed equipment should be individually listed by description and estimated cost, including tax, and adequately justified. Allowable items ordinarily will be limited to scientific equipment that is not already available for the conduct of the work. General purpose office equipment normally will not be considered eligible for support.

4.3 Domestic Travel

The type and extent of travel and its relation to the research should be specified. Funds may be requested for attendance at meetings and conferences, other travel associated with the work and subsistence. In order to qualify for support, attendance at meetings or conferences must enhance the investigator's capability to perform the research, plan extensions of it, or disseminate its results. Consultant's travel costs also may be requested.

4.4 Foreign Travel

Foreign travel is any travel outside Canada and the United States and its territories and possessions. Foreign travel may be approved only if it is directly related to project objectives.

4.5 Other Direct Costs

The budget should itemize other anticipated direct costs not included under the headings above, including materials and supplies, publication costs, computer services, and consultant services

(which are discussed below). Other examples are: aircraft rental, space rental at research establishments away from the institution, minor building alterations, service charges, and fabrication of equipment or systems not available off-the-shelf. Reference books and periodicals may be charged to the project only if they are specifically related to the research.

a. Materials and Supplies

The budget should indicate in general terms the type of required expendable materials and supplies with their estimated costs. The breakdown should be more detailed when the cost is substantial.

b. Publication Costs/Page Charges

The budget may request funds for the costs of preparing and publishing the results of research, including costs of reports, reprints page charges, or other journal costs (except costs for prior or early publication), and necessary illustrations.

c. Consultant Services

Anticipated consultant services should be justified and information furnished on each individual's expertise, primary organizational affiliation, daily compensation rate and number of days expected service. Consultant's travel costs should be listed separately under travel in the budget.

d. Computer Services

The cost of computer services, including computer-based retrieval of scientific and technical information, may be requested. A justification based on the established computer service rates should be included.

e. Subcontracts

Subcontracts should be listed so that they can be properly evaluated. There should be an anticipated cost and an explanation of that cost for each subcontract. The total amount of each subcontract should also appear as a budget item.

4.6 Indirect Costs

Explain the basis for each overhead and indirect cost. Include the current rates.