Aviation Climate Change Research Initiative Two (ACCRI2)

Part
U.S. Government Procurements

Classification Code
A-Research and development

Office Address
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Solicitation Number
DTRT57-09-R-20030

Response Date
September 17,2009

POC
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Description
The Volpe National Transportation Systems Center (Volpe Center)is issuing a Broad Agency Announcement (BAA) to solicit research proposals on a competitive basis to pursue ways to coordinate activities relevant to quantifying the climate impacts of aviation for the Federal Aviation Administration (FAA) and the National Aeronautics and Space Administration (NASA). This will be a full and open procurement. The goal of this coordinated Aviation Climate Change Research Initiative Two (ACCRI2) is to improve the scientific understanding and modeling capability to assess aviation climate impacts and reduce key uncertainties associated with these impacts. This is to be a multi-year research and analysis driven program. Direct questions electronically to Steve.Garanin@dot.gov, by Close of Business on September 10, 2009.

Background
Aviation is integral to the global economy and transportation system. Despite ongoing short term market volatility, aviation is projected to grow in the future. Environmental concerns due to aviation activities range from noise levels near airports to impacts of emissions on regional ambient air quality and global climate. Growth in aviation may lead to increased aircraft emissions and associated environmental impacts unless well informed optimally balanced mitigation measures are implemented in a timely manner. The United States is implementing an efficient, flexible, scalable and dynamic Next Generation Air Transportation System (NextGen) to meet projected aviation growth. NextGen was enacted in 2003 under Vision 100 – Century of Aviation Reauthorization Act (http://www.jpdo.gov/nextgen.asp). In order to balance the economic and mobility

benefits of air transportation with environmental concerns, one of the stated environmental goals of the NextGen is to limit or reduce the impacts of aviation emissions on global climate. Among other environmental impacts, aviation climate impacts are quite uncertain with a level of scientific understanding that ranges from 'medium' to 'low', particularly for non-CO2 forcings that are relatively short-lived and quite spatially inhomogeneous. For aviation, the instantaneous non-CO2 radiative forcing from operation of the current fleet is estimated to be nearly equal or to exceed the instantaneous forcing from cumulated CO2 associated aviation to-date.

Under the auspices of the Environmental Working Group (EWG) of the NextGen Joint Planning and Development Office (JPDO), and as a part of its five-pillar plan to meet NextGen environmental goals, the Federal Aviation Administration (FAA) and Volpe Center have developed the Aviation Climate Change Research Initiative (ACCRI) with support from other federal agencies that participate in the U.S. Climate Change Science Program. ACCRI, a sequentially structured program, is designed with a goal to develop better scientific understanding for better decision-making. Its objective is to identify and address key scientific gaps and uncertainties on a priority basis while providing timely scientific input to inform optimum aviation climate impact mitigation actions and policies. The underlying approach of ACCRI is to focus on policy relevant, solution-oriented aviation climate change research activities while coordinating and linking ACCRI research needs with related national and international atmospheric and climate change research efforts.
Towards this goal, ACCRI funded efforts have produced 8 subject-specific white papers that provide an in-depth review of the latest state of knowledge, uncertainties, analysis capabilities and gaps as well as recommendations for key research and analyses to quantify and improve the estimates of climate impacts of aviation. In particular, these white papers focused on chemistry and transport processes relating aviation emissions to changes in atmospheric chemical composition, contrails and induced cirrus clouds, and climate impacts and metrics. To involve a broader community, ACCRI convened a science meeting in 2008 that resulted in the release of a report on *The Way Forward Based on the Review of Research Gaps and Priorities*. One key recommendation from the report is that ACCRI needs to be a multi-year research and analysis driven program with responsibility to deliver realistic outcomes scheduled to match decision-making. These documents have identified key research gaps and prioritized them based on their potential to *significantly* improve quantitative estimates of aviation climate impacts and resources needed to deliver the outcomes on various time frames ranging from near-term (12 months), mid-term (24 months), and long-term (36 months). All these documents are posted on the ACCRI website:

(http://www.faa.gov/about/office_org/headquarters_offices/aep/aviation_climate/).

This Volpe Center solicitation will fund Round Two of ACCRI research (ACCRI2) as described in detail below.

Areas of Solicitation

The ACCRI report identified several key areas that need in-depth data analysis, observations as well as modeling simulations and analysis in order to develop improved estimates of aviation climate impacts. Without any particular ranking, these areas are:

1. Measurement, modeling and analysis of temperature, relative humidity and ice supersaturation in the upper troposphere and lower stratosphere (UTLS) region;
2. Observations and analyses of contrails and cirrus clouds related data (microphysical, optical, radiation and spatial coverage data);
3. Process based multiscale lifecycle modeling of contrails and cirrus clouds and their climate impacts;
4. Microphysical and lifecycle modeling of aircraft related aerosols and related direct and indirect climate impacts;
5. Improved understanding of interplay between NOx and HOx, particularly at high NOx levels in flight corridors while relating observational data with modeling simulations;
6. Role of halogens in the UTLS region and interaction with aircraft emissions particularly in the flight corridor regions;
7. Multiscale role of aerosols and ice-phase heterogeneous chemistry in the UTLS region;
8. Better characterization of aircraft emissions at cruise altitude;
9. Correlative analyses of aviation emissions and atmospheric changes in the aviation flight corridors;
10. Modeling simulations of aviation climate impacts; and
11. Development and evaluation of common metrics that can be used to compare climate impacts among aviation related emissions as well as with those due to non-aviation emissions.

This Volpe Center solicitation primarily focuses on near-term (12 months), mid-term (24 months), and long-term (36 months) research and analyses objectives as outlined in the ACCRI report. It is open to federal and non-federal U.S. researchers and international organizations. Any proposal accepted from a U.S. Government agency will require an interagency agreement (IAA) with the Volpe Center.

Proposals sought under this ACCRI2 solicitation are anticipated to:

- Better link aviation emissions with climate impacts with specific attention to:
  - isolate and improve magnitudes of individual components of aviation emissions induced climate impacts on global and regional, particularly the Arctic Polar Region, scales with reduced uncertainties;
  - examine linearity and additivity of component based aviation induced

  - develop and evaluate aviation climate impacts metrics, (including change in surface temperature), to interrelate aviation climate impacts (CO2 and non-CO2) on various time horizons to help develop better understanding of impacts due to emissions tradeoffs.
- Simulate all (or most of the) aviation emissions climate impacts on global and/or regional scales within a single integrated modeling framework both for the present and future aviation and changing climate conditions consistent with the IPCC emissions scenarios, and additionally,
  - quantify interdependency among components based aviation emissions induced climate impacts; and
  - estimates of discernible aviation climate impacts based on the range of technically feasible emissions range.
- Examine a wide spectrum of observation data from all platforms with specific attention to aviation emissions in flight traffic corridors (including the datasets that will be available during this ACCRI2 performance period).
- Investigate how aviation emissions perturb UTLS composition and thermal structure and this perturbation in turn impact the climate response of aviation emissions and background atmosphere.
- Examine the validity of results from simplified parametric aviation climate impacts models against those derived from the use of comprehensive models both for present and future conditions.
- Develop contrails and induced cirrus cloud prediction capability in regional weather models (e.g. WRF – Weather Research and Forecasting Model) that provide weather prediction for aviation operations.

The ACCRI2 program will provide highly resolved gridded and chorded flight by flight regional and global aircraft emissions data for 2006 (and possibly for 2008) as a bench mark year, and also for future aviation activity and emissions scenarios (e.g. 2025, 2050). It is expected that the FAA emissions data will be used for both modeling simulations and observational analyses. Therefore, it is anticipated that most of the analysis designed to correlate observational atmospheric data and aircraft activity data will focus on year 2006 (and 2008).

ACCRI2 will convene annual science meetings over the 3 year period of this anticipated effort to share and discuss the research in progress and establish a coordinated research plan based on the lessons learned. Attendance of the ACCRI2 funded teams at these meetings is **highly recommended and encouraged,** but will not be mandatory. Funding for attendance at these meetings should be included in the proposal, or a reason for

refusal to attend these meetings should be given, which may be considered in the proposal evaluation. For evaluation purposes, the Government will allow $9,000 per year per proposal for these expenses. The total for the proposed three (3) years of this study shall not exceed $27,000.

Anticipated funding

Anticipated funds available to support proposals under this solicitation would span December 2009 through December 2012. The Volpe Center expects to fund up to 10 proposals with a mix of activities on model simulations and reporting and UTLS region-aviation corridor specific observation data analyses, including aviation emissions and impacts correlative analysis. Initially, FY09 funds will be available for the first year activities. Funding for the optional second and third years will be contingent upon ACCRI2's ability to secure the funds in FY10 and FY11. Therefore, the proposal and project activities shall be structured to provide concrete and useful deliverables at the end of each funding year with respect to the short-term, mid-term, and long-term goals.

Tasks

This Call for Proposals relates directly to the tasks outlined below that will be performed by each contractor:

Year I (Base Year):

Task 1. Submit Year I quarterly report on the outcomes and work in progress. The deliverable will be the quarterly report in MS Word format. (Due on the following dates: March 31, 2010, June 30, 2010, September 30, 2010, and December 31, 2010.)

Task 2. Attend Year I annual science meeting convened by ACCRI2 to share and discuss the research in progress and lessons learned. Attendance of the ACCRI2 funded teams at this meeting is **highly recommended and encouraged,** but not mandatory. Any known reason for refusal to attend these meetings should be provided in the proposal and may be considered as part of the proposal evaluation.

Task 3. Contractor must identify the findings within the report, which are proposed for publication . The deliverable will be an advance copy in MS Word format or hardcopy of any paper or article that may be published. Proposed publication is subject to Volpe Center and FAA review and approval of proposed publication material. Publication is not mandatory.

Task 4. Perform aviation emissions related atmospheric and climate impacts analyses as outlined in the selected proposal. The work under this effort is expected to start on December 31, 2009. The deliverable will be a report in MS Word format. (Due December 31, 2010.)

Task 5. Submit Year I annual project progress report. The deliverable will be the progress report in MS Word format. (Due December 31, 2010.)

Year II (Option Year 1, contingent upon availability of FY10 ACCRI2 research funds):

Task 6. Submit Year II quarterly report on the outcomes and work in progress. The deliverable will be the quarterly report in MS Word format. (Due on the following dates: March 31, 2011, June 30, 2011, September 30, 2011, and December 31, 2011.)

Task 7. Attend Year II annual science meeting convened by ACCRI2 to share and discuss the research in progress and lessons learned. Attendance of the ACCRI2 funded teams at this meeting is **highly recommended and encouraged,** but not mandatory. Any known reason for refusal to attend these meetings should be provided in the proposal and may be considered as part of the proposal evaluation.

Task 8. Contractor must identify the findings within the report, which are proposed for publication . The deliverable will be an advance copy in MS Word format or hardcopy of any paper or article that may be published. Proposed publication is subject to Volpe Center and FAA review and approval of proposed publication material. Publication is not mandatory.

Task 9. Perform aviation emissions related atmospheric and climate impacts analyses as outlined in the selected proposal. The work under this effort is expected to start December 31, 2010. The deliverable will be a report in MS Word format. (Due December 31, 2011.)

Task 10. Submit Year II annual project progress report. The deliverable will be the progress report in MS Word format. (Due December 31, 2011.)

Year III (Option Year 2, contingent upon availability of FY11 ACCRI2 research funds):

Task 11. Submit Year III quarterly report on the outcomes and work in progress. The deliverable will be the quarterly report in MS Word format. (Due on the following dates: March 31, 2012, June 30, 2012, September 30, 2012, and December 31, 2012.)

Task 12. Attend Year III annual science meeting convened by ACCRI2 to share and discuss the research in progress and lessons learned. Attendance of the ACCRI2 funded teams at this meeting is **highly recommended and encouraged,** but not mandatory. Any known reason for refusal to attend these meetings should be provided in the proposal and may be considered as part of the proposal evaluation.

Task 13. Contractor must identify the findings within the report, which are proposed for publication . The deliverable will be an advance copy in MS Word format or hardcopy of any paper or article that may be published. Proposed publication is subject to Volpe Center and FAA review and approval of proposed publication material. Publication is not mandatory.

Task 14. Perform aviation emissions related atmospheric and climate impacts analyses as outlined in the selected proposal. The work under this effort is expected to start December 31, 2011. The deliverable will be a report in MS Word format. (Due December 31, 2012.)

Task 15. Submit Year III annual project progress report. The deliverable will be the progress report in MS Word format. (Due December 31, 2012.)

Task 16. Submit final End of Project Summary report. The deliverable will be a Summary report in MS Word format. (Due December 31, 2012.)

Call for Proposals

Proposals may be submitted by teams of science experts, led by a Principal Investigator (PI), who are familiar with aviation-climate impact issues and are presently active in the related research activities. This solicitation is open to federal and non-federal U.S. researchers and international organizations. The proposals must be submitted to Stephen A Garanin, Contracting Officer, as per the directions found in the in the final section of this solicitation, entitled: Submission of Proposals.

NOTE: All questions regarding this solicitation must be received in electronic format only, no later than Close of Business on September 10, 2009.

Funding Mechanism

These can take the form of either a contract or an interagency agreement, depending upon the nature of a particular project and discussions between the Volpe National Transportation Systems Center and the offeror.

To be eligible for award of a contract resulting from this solicitation, a contractor must be registered in the Federal Government's "Central Contractor Registration" (CCR), **AND** be registered in the Federal Government "Online Representation and Certifications Application" (ORCA). Both of these separate registrations can be accomplished through the following website: http://www.bpn.gov.

First, a prospective awardee must have a Dun and Bradstreet number (DUNS). If your organization does not have a DUNS number, one can be obtained telephonically at (866) 705-5711 or be visiting https://eupdate/dnb.com.

Second, the organization must be registered in the Federal government's Central Contractor Registry (CCR) found at www.crr.gov. Please note, CCR registration cannot be completed without a DUNS number.

NOTE: When properly registered in each of these systems, the contractor will receive an automatic acknowledgement confirming successful registration in each system. Without such acknowledgements, the registrations are not complete.

Guidelines for Proposal Preparation

Each proposal must have a title page clearly identifying the key area or areas that the proposal addresses. Each PI is limited to submit one proposal that may address multiple key areas listed above. The technical content of the proposal is limited to 5 pages (single space, 12 pt Times New Roman font), excluding references. If the proposal addresses multiple areas, each additional area will merit another 2 pages. There must be a single page summarizing an estimate of hourly labor and cost for participation in annual ACCRI2 science meeting. Proposed funding for each proposal should not exceed

$150,000 per year including travel expenses. There must be included a professional résumé of the team explaining education and work background and works published.

Proposal Concept Paper
(The following is for illustration purposes only.)

Technical Concept
Title; Applicant/Offeror; Capabilities; Objective; Potential Application; Maturity and Adaptation; Test Bed; Project Description.

Phased or Follow-on Work
Optional Section not to exceed 3 - 5 pages. Does not count in 5-page limit.

Resumes/C.V.s
1 to 2 pages for Principle Investigator. 1 page per each Team member. Both explaining education, work background and works published. Does not count in 5-page limit.

Cost or Price
The maximum allowable cost for Travel Expenses is $9,000. Does not count in 5-page limit.

Proposal Evaluation Criteria
The Volpe Center will convene a scientific review panel to make a recommendation of the selected proposals to the Contracting officer for final selection, based on the following evaluation criteria. Each of these criteria will receive equal weight, with no single criteria more important than any other in the evaluation process. The Selection panel will conduct the technical evaluation first. The price of proposals will be looked at and evaluated second.

(1) Technical merits of the proposal, including the following:
- Does the proposal address one or more of the listed specific key areas with specific relevance to aircraft emissions?
- Does the proposal coordinate and link ACCRI2 funded climate research activities with other domestic and international funded atmospheric and climate research activities?
- Does the proposal form domestic and/or international teams in order to bring the best simulation and analysis capabilities to the project?
- For assessment calculations of the NOx-ozone-CH4 effect, studies using interactive chemistry climate models (CCM) will have preference over studies using chemical transport models (CTM).

(2) Practical commentary on the relevance, utility, and likelihood of success of the long-term research outcomes.

(3) Technical team qualifications, including résumés, work experience, and publication record of each member in each specific key area proposed. The PIs must be active and have a publication record in the specific area(s) being proposed
(4) Proposal price.

Final selection of proposals must be approved by the Volpe Center Contracting Officer (CO).

Submission of proposals

In preparing proposal concept paper for submission to the Volpe Center, offerors are reminded to carefully read this entire solicitation and to comply with all content and format requirements.

For identification purposes, submissions should reference the solicitation number and title (DTRT57-09-R-20030 – Aviation Climate Change Research Initiative Two (ACCRI2)) on the outer packaging and on the submission itself.

Offerors shall submit one original and ten (i.e., a total of eleven) paper copies of the proposal concept paper and related materials.

Offerors shall submit proposal concept paper and related materials via regular U.S. mail or express delivery, to arrive not later than 2:00PM EST on September 17, 2009, at the following address:

Stephen A Garanin
Contracting Officer
U.S. Department of Transportation
RITA/Volpe Center RVP-32
55 Broadway
Cambridge, MA 02142-1001

Offerors shall submit proposal concept paper and related materials via electronic mail, so as to arrive not later than 2:00PM September 17, 2009, at the following address:

Steve.Garanin@DOT.GOV

Attachment 1 – Deliverables and Period of Performance