

PROGRAM ANNOUNCEMENT

Fiscal Year 2008 Test and Evaluation (T&E) Research Program

AFOSR BAA 2008-2

PROPOSAL DEADLINE:

4:00 p.m. Eastern Standard Time
1 Feb 2008

OVERVIEW INFORMATION

- **Agency Name(s)** –The Air Force Office of Scientific Research (AFOSR) in cooperation with Arnold Engineering Development Center (AEDC), Air Force Flight Test Center (AFFTC) and Air Armament Center (AAC)
- **Funding Opportunity Title** – *Fiscal Year 2008 Test and Evaluation (T&E) Research Program*
- **Announcement Type** – This is the initial announcement.
- **Funding Opportunity Number** - AFOSR BAA 2008-2.
- **Catalog of Federal Domestic Assistance (CFDA Number(s))** – 12.800 - Air Force Defense Research Sciences Program.
- **Dates** – Proposals must be received by 4:00 P.M. Eastern Standard Time, 1 Feb 2008.
- **Additional Overview Content--** The topics listed below represent basic research needs identified by the Air Force Test and Evaluation Community. AFOSR and the T&E Community agree that successful research efforts in these areas have the potential to significantly improve future capabilities in the Test and Evaluation community.

I. Funding Opportunity Description

The topics listed below represent basic research needs identified by the Air Force Test and Evaluation Community. AFOSR and the T&E Community agree that successful research efforts in these areas have the potential to significantly improve future capabilities in the Test and Evaluation community.

Research Topics: The topics listed below represent basic research needs identified by the Air Force Test and Evaluation Community. AFOSR and the T&E Community agree that successful research efforts in these areas have the potential to significantly improve future capabilities in the Test and Evaluation community.

Topic 1: Simulation of Vortices in Ground Test Facilities

Numerous studies have been performed on the interaction between coherent vortical structures and boundary layers (e.g. wing tip vortex generation and manipulation; Crow instability; wake vortices at airports, etc.). While wind tunnel facilities have been used to study such phenomena, many questions remain on how the wind tunnel environment affects results and how to account for discrepancies between the wind tunnel and free flight test environments.

Proposals are sought for an integrated numerical, experimental and theoretical study of ground test considerations and corrections required when significant coherent vortical structures are present in tests. Considerations include, but are not limited to, test article scale, wall interference, inlet flow non-uniformities, inlet turbulence levels, and compressibility effects. The goal for this study is an integrated assessment of significant factors, including acceptable levels, affecting ground testing and comprehensive corrections of ground test data to simulate free flight conditions.

References:

- 1) Barlow, Rae, Pope, "Low-Speed Wind Tunnel Testing, 3rd Edition, 1999
- 2) Langer, H. -J., Peterson, R. L. and Maier, T., "An Experimental Evaluation Of Wind Tunnel Wall Correction Methods For Helicopter Performance," Proceedings of the 52nd Annual Forum of the American Helicopter Society, June 1996.
- 3) Rae, W., Jr.; Shindo, S., "An Experimental Investigation of Wind Tunnel Wall Corrections and Test Limits for V/STOL Vehicles", Jul 1973, DTIC AD0764255.
- 4) Freymuth, P.; Bank, W.; Finaish, F.; "Visualization of wing tip vortices in accelerating and steady flow", Journal of Aircraft 1986 0021-8669 vol.23 no.9 (730-733)

5) Wickern, G.; “Wake Related Wind Tunnel Corrections for Closed Wall Test Sections”, SAE technical paper 2006-01-0567

Points of Contact

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Topic 2: Non-Invasive Temperature/Pressure Measurement

The need is to demonstrate the feasibility to non-intrusively measure temperature and pressure within a turbine engine during normal engine-on operations. Conceptually, measurements must be achievable with absolutely no cutting or drilling or otherwise invading the engine case or introduction of foreign material into the engine. A completely non-contact capability is ideal, but external contact with the engine is tolerable. Measurement of steady-state bulk properties of stagnation temperature and stagnation pressure within the gas path is needed. Measurements are needed at the interfaces of major engine modules (e.g., fan, compressor, high pressure and low pressure turbines, combustor, augmentor, bypass duct, nozzle).

Non-intrusive temperature measurement using neutron resonance radiography is a possible candidate for a solution. Optical systems that measure temperature of air flows in turbine engine intakes have also been demonstrated. Non-intrusive measurements of the working medium are in use today in support of chemical process control. These techniques may be applicable to the problem description. Additionally, advances in the medical field have enabled the non-intrusive and automated measurement of parameters that are important to human well-being, including body temperature and blood pressure. These techniques may also be applicable to the problem description.

References:

1) http://www.dodsbir.net/sitis/view_pdf.asp?id=ASME04.pdf

PREPARATIONS FOR SMART SENSOR USAGE IN AIRCRAFT GAS TURBINE TESTING

Grant Patterson, Mike Bennett, Andy Nelius, and William Irby, Aerospace Testing Alliance, Arnold Engineering Development Center, Arnold Air Force Base, TN 37389 and Owen Boals, Consultant.

2) <http://www.springerlink.com/content/k07m1106p7137g33/>

Non-intrusive temperature measurement of the components of a working catalyst by neutron resonance radiography, Frost, Meehan, Morris, Ward, Mayers, Chemistry and Materials Scienc, DOI 10.1007/BF00774591.

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Topic 3: Improved Test methodologies for the evaluation of boundary layer transition phenomenon

Current hypersonic ground and flight test techniques lead to great uncertainty with regard to boundary layer transition. Reliable simulation and control of high-speed laminar-turbulent transition on real flight vehicles will require further experimental research, even though much progress has been made. Maintaining low laminar heating may be critical to hypersonic gliding reentry vehicles such as those being considered for Prompt Global Strike (PGS). The interpretation of nearly all existing boundary-layer transition data is somewhat ambiguous due to differences between results obtained in various hypersonic wind tunnels and differences between wind-tunnel and flight results. A tool is needed that can describe ground test data and improve its relevance to flight test prediction. Mechanism-based models such as STABL are presently being developed under the AFOSR-led Stability and Transition Analysis for Reentry (STAR) effort in support of the AF/DARPA Falcon program. These mechanism-based prediction models

are showing great promise in the area of predicting transition sensitivity to a single mechanism. However the test instrumentation and methodologies are lacking in their ability to measure the relevant parameters of interest to the computationalists to fully describe the modes of transition at the level required to validate these models. If mechanism-based tools can be validated they hold the promise of being able to improve the design of wind-tunnel test programs as well as providing the means for relating wind-tunnel boundary-layer transition trends to flight.

The objective of this research is to develop new or improved instrumentation and methodology to describe the mechanisms that lead to boundary layer transition for the validation of mechanism-based computational prediction models such as STABL. This effort will not attempt to develop a new analysis code but will leverage the on-going AFOSR work in this area. This effort will hopefully provide a blueprint for the collection of meaningful wind tunnel data to address the boundary-layer transition issues for future hypersonic system development.

Air Force Programs Supported: Falcon HTV-1 and 2, CTM, CSM, AHW or any other future CAV or Prompt Global Strike (PGS) concepts. All manned reentry systems to include Reusable Launch vehicles (RLV) concepts such as FAST.

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Topic 4: Improved Computational Fluid Dynamics (CFD) Modeling and Design Capability for Hypervelocity Wind Tunnel Nozzles

Maneuvering hypersonic reentry vehicle design, such as is being considered for prompt global strike, requires the highest quality data for validation of vehicle aerodynamic and aerothermodynamic CFD simulations. This requirement has put a new emphasis on wind tunnel data quality and the influence of nozzle flow quality and uniformity on this data. While

improvements in CFD methods have progressed to the point where reasonable simulation of the internal flow can be achieved for some hypersonic nozzles, the agreement between calibration data and simulation is highly dependent on many features. These features could include nozzle geometry (high L/D versus low L/D for example) and/or the inclusion of pertinent flow physics (physical joints, turbulence model selection, real gas effects, etc.). Therefore, it is difficult to state uniformly that recent CFD improvements translate to accurate representation of existing or future hypervelocity wind tunnel nozzles. This is especially true in higher Mach number nozzles such as the AEDC Hypervelocity Tunnel 9 Mach 14 nozzle. Therefore, improvements are needed to provide necessary guidance for future nozzle design or improvements for Mach numbers greater than Mach 10.

Improved modeling of the facility flow would improve validation vehicle CFD by allowing the integrated test and evaluation team to apply this flow to test article in the short term and provide the ability to identify design fixes to the hardware or design a new nozzle that can produce more uniform flow in the long term. In either case this can help reduce uncertainty and reduce risk in a design.

Finally a need exists to provide a higher Mach number capability, on the order of Mach 18 - 20 to support the development of future maneuvering systems. In order to proceed with such a design improved and validated tools are needed to provide confidence and proved guidance in a design prior to a large capital investment associated with building new hardware.

The objective of this research is to develop improvements to existing CFD code/s for purpose of modeling current nozzles and to support future nozzle design. This will require improvements in how the code represents reality to ensure that pertinent flow physics such physical imperfections (joints), turbulence models, real gas effects, etc. are model accurately. Work supporting this topic will require validation in an appropriate test environment such as the AEDC Tunnel 9 Mach 14 nozzle.

Air Force Programs Supported: Falcon HTV-1 and 2, CTM, CSM, AHW or any other future CAV or Prompt Global Strike (PGS) concepts. All manned reentry systems to include Reusable Launch vehicles (RLV) concepts such as FAST.

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II. Award Information

The anticipated types of awards are grants, cooperative agreements or contracts. Each project selected will be funded at approximately \$100 K per year for a maximum of three years. The number of efforts selected for funding will be subject to the amount of funds available.

III. Eligibility Information

- 1. Eligible Applicants** – All responsible, potential applicants from academia and industry are eligible to submit proposals. AFOSR particularly encourages proposals from small businesses, historically black colleges and universities, minority institutions and minority researchers. However, no portion of this BAA is set aside for a specific group. Cost sharing is encouraged but not required.
- 2. Cost Sharing or Matching** – Cost Sharing is not required.
- 3. Other** – Some research projects may require access to unclassified-sensitive information that will require additional agreement with that Test and Evaluation Center. In these cases, publications may require review by the Air Force prior to public release.

There are no limits to the number of applications an applicant may submit.

IV. Application and Submission Information

1. Address to Request Announcement Package – This announcement may be accessed from the Internet at the Grants.gov web site (<http://www.grants.gov>). See 'For Electronic Submission' below.

2. Marking of Proposals - Every effort should be made to protect the confidentiality of the proposal and any evaluations. However, under the Freedom of Information Act (FOIA) requirements, such information (or portions thereof) may potentially be subject to release. The proposer must mark the proposal with a

protective legend found in FAR Part 15.609, Limited Use of Data, (modified to permit release to outside evaluators retained by AFOSR) if protection is desired for proprietary or confidential information.

3. Content and Form of Application Submission –

a. Full Proposals. The proposal may be submitted either electronically or in hard copy form, but not both. All proposers must include the SF 424 (R&R) form as the cover page. Unnecessarily elaborate brochures, reprints or presentations beyond those sufficient to present a complete and effective proposal are not desired. To convert attachments into PDF format, Grants.gov provides a list of PDF file converters at http://www.grants.gov/resources/download_software.jsp.

Full Proposal Format

- Paper Size – 8.5 x 11 inch paper
- Margins – 1 inch
- Spacing – single or double spaced
- Font – Times New Roman, 10 or 12 point
 - Page Limitation – None, although unnecessarily elaborate proposals are not desirable.
 - Attachments – submit in **PDF** format (Adobe Portable Document Format)
 - Copies for hardcopy submissions – (one original, number of copies as discussed with the Program Manager)
- Content – as described below

(1) **Advance Preparation For Electronic Submission** - Electronic proposals must be submitted through Grants.gov. There are several one-time actions your organization must have completed before it will be able to submit applications through Grants.gov. Well before the submission deadline, you should verify that the persons authorized to submit proposals for your organization have completed those actions. If not, it

may take them up to 21 days to complete the actions before they will be able to submit applications.

The process your organization must complete includes obtaining a Dun and Bradstreet Data Universal Numbering System (DUNS) number, registering with the Central Contract Registry (CCR), registering with the credential provider, and registering with Grants.gov. (Designating an E-Business Point of Contact (EBiz POC) and obtaining a special password called MPIN are important steps in the CCR registration process.) Go to http://www.grants.gov/applicants/get_registered.jsp. Use the Grants.gov Organization Registration Checklist at <http://www.grants.gov/section3/OrganizationRegCheck.pdf> to guide you through the process. To submit a proposal to through Grants.gov, applicants will need to download Adobe Reader. This small, free program will allow you to access, complete, and submit applications electronically and securely. To download a free version of the software, visit the following web site: http://www.grants.gov/resources/download_software.jsp. Should you have questions relating to the registration process, system requirements, how an application form works, the submittal process or Adobe Reader forms, call Grants.gov at 1-800-518-4726 or support@Grants.gov for updated information.

(2) Submitting the Application

(a) For Electronic Submission – 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 follow the instructions. In the search function, enter the funding opportunity number for this announcement (AFOSR BAA 2008-1). Or you can enter the CFDA number for AFOSR which is 12.800, Air Force Defense Research Sciences Program (AFOSR). Then follow the prompts to download the application package.

The funding opportunity will be listed multiple times. The funding opportunity number is identical for each listing. When you download the instructions and application, select the Competition ID and Competition Title for the directorate specific to your area of interest.

If you are unsure which directorate and program manager is appropriate for your specific area of interest, select the Competition ID and Competition Title “Other” to apply. Your proposal will be forwarded to the appropriate office.

Note: All attachments to all forms must be submitted in PDF format (Adobe Portable Document Format). Grants.gov provides links to PDF file converters at this site: <http://grants.gov/agencies/asoftware.jsp#3>.

(b) For Hard Copy Submission – For hard copy submission, the original proposal and copies must be delivered to the attention of the program manager at the Air Force Office of Scientific Research at the following address:

AFOSR (Attn: Name of Program Manager)
Air Force Office of Scientific Research
875 North Randolph Street, Room 3112
Arlington VA 22203

In case of difficulties in determining the appropriate AFOSR addressee, proposals may be submitted to:

AFOSR/PKC
875 Randolph Street, Room 3112
Arlington VA 22203-1954

(c) SF 424 Research and Related (R&R) - The SF 424 (R&R) form must be used as the cover page for all electronic and hard copy proposals. No other sheets of paper may precede the SF 424 (R&R) for a hard copy proposal. A signed copy of the SF 424 (R&R) should be submitted with all hardcopy proposals. Complete all the required fields in accordance with the “pop-up” instructions on the form and the following instructions for the specified fields. To activate the instructions, turn on the “Help Mode” in Grants.gov. (The “Help Mode” is turned on by the icon with the pointer and question mark. This is located at the top of the form). In grants.gov, some fields will self populate based on the BAA selected. Please fill out the SF 424 first, as some fields on the SF 424 are used to auto populate fields in other forms. The completion of most of the fields is self-explanatory except for the following special instructions:

- **Field 2:** The Applicant Identifier may be left blank.
- **Field 3:** The Date Received by State and the State Application Identified are not applicable to research.
- **Field 7:** Complete as indicated. If Small Business is selected, please note if the organization is Woman-owned and/or Socially and Economically Disadvantaged. If the organization is a Minority Institution, select "Other" and under “Other (Specify)” note that you are a Minority Institution (MI).

- **Field 9:** List Air Force Office of Scientific Research as the reviewing agency. This field is pre-populated in grants.gov.

- **Field 17:** Choose 'No'. AFOSR programs are not subject to Executive Order 12372.

- **Attachments: All attachments to all Grants.gov forms must be submitted in PDF format** (Adobe Portable Document Format). To convert attachments into PDF format, Grants.gov provides a list of PDF file converters at http://www.grants.gov/resources/download_software.jsp

A signed copy of the SF 424 (R&R) should be submitted with all hardcopy proposals.

(d) Certification: All awards require some form of certifications of compliance with national policy requirements.

For assistance awards, i.e., grants and cooperative agreements, proposers using the SF 424 (R&R) are providing the certification required by 32 CFR Part 28 regarding lobbying. (The full text of this certification may be found at <http://www.wpafb.af.mil/shared/media/document/AFD-070817-127.pdf>). If you have lobbying activities to disclose, you must complete the optional form **SF-LLL**, Standard Form – LLL, 'Disclosure of Lobbying Activities' in the downloaded PureEdge forms package.

For contract awards, prospective contractors shall complete electronic annual representations and certifications at <http://www.bpn.gov/orca> in conjunction with required registration in the Central Contractor Registration (CCR) database. Prospective contractors shall update the representations and certifications submitted to ORCA as necessary, but at least annually, to ensure they are kept current, accurate, and complete. The representations and certifications are effective until one year from date of submission or update to ORCA. In addition to the ORCA representations and certifications, prospective contractors shall complete the AFOSR Contract Certification which can be located at <http://www.wpafb.af.mil/shared/media/document/AFD-070820-024.doc>. The AFOSR Contract Certifications are to be submitted at the time of proposal submission.

(e) **Research and Related (R&R) Other Forms:** The following other forms must be used for all electronic and hard copy proposals: R&R Senior/Key Person Profile form, R&R Project/Performance Site Locations form, R&R Other Project Information form and the R&R Budget form. The R&R

Subaward Budget Attachment Forms is required when subawardees are involved in the effort. The SF-LLL form is required when applicants have lobbying activities to disclose. PDF copies of all forms may be obtained at the grants.gov website.

(f) R&R Senior/Key Person Profile Form – Complete the R&R Senior/Key Person Profile Form for those key persons who will be performing the research. Information about an individual is subject to the requirements of the Privacy Act of 1974 (Public Law 93-579). The information is requested under the authority of Title 10 USC, Sections 2358 and 8013. The principal purpose and routine use of the requested information are for evaluation of the qualifications of those persons who will perform the proposed research. Failure to provide such information will delay award. For the principal investigator and each of the senior staff, provide a short biographical sketch and a list of significant publications (vitae) and attach it to the R&R Senior/Key Person Profile Form.

(g) R&R Project/Performance Site Locations Form – Complete all information as requested.

(h) R&R Other Project Information Form - Human Subject/Animal Use and Environmental Compliance.

Human Subject Use. Each proposal must address human subject involvement in the research by addressing Field 1 and 1a of the R&R Other Project Information Form. If Field 1 indicates “Yes”, the Air Force must receive a completed OMB No. 0990-0263 form before a contract, grant, or cooperative agreement may be awarded to support research involving the use of human subjects. Attach the document to the R&R Other Project Information Form. If using grants.gov, a completed OMB No. 0990-0263 form shall be attached in field 11 of the R&R Other Project Information Form. The OMB No. 0990-0263 is available electronically at: <http://apply.grants.gov/apply/forms/sample/ProtectionofHumanSubjects-V1.1.pdf> Refer any questions regarding human subjects to the AFOSR Directorate of Mathematics, Information and Life Sciences at (703) 696-7720.

Animal Use. Each proposal must address animal use protocols by addressing Field 2 and 2a of the R&R Other Project Information Form. If selected for award, additional documentation in accordance with Air Force standards will be required. Refer any questions regarding animal subjects to the AFOSR Directorate of Mathematics, Information and Life Sciences at (703) 696-7720.

Environmental Compliance. Federal agencies making contract, grant, or cooperative agreement awards and recipients of such awards must comply with various environmental requirements. The National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. Sections 4321-4370 (a), requires that agencies consider the environmental impact of “major Federal actions” prior to any final agency decision. With respect to those awards which constitute “major Federal actions,” as defined in 40 CFR 1508.18, federal agencies may be required to comply with NEPA and prepare an environmental impact statement (EIS) even if the agency does no more than provide grant funds to the recipient. Questions regarding NEPA compliance should be referred to the AFOSR legal staff at (703) 696-9705. Most research efforts funded by AFOSR will, however, qualify for a categorical exclusion from the need to prepare an EIS. Air Force instructions/regulations provide for a categorical exclusion for basic and applied scientific research usually confined to the laboratory, if the research complies with all other applicable safety, environmental and natural resource conservation laws. Each proposal shall address environmental impact by filling in fields 4a through 4d of the R&R Other Project Information Form. This information will be used by AFOSR to make a determination if the proposed research effort qualifies for categorical exclusion.

Abstract - Include a concise (not to exceed 300 words) abstract that describes the research objective, technical approaches, anticipated outcome and impact of the specific research. In the header of the abstract include the program manager’s name and directorate who should receive the proposal for consideration and evaluation. Attach the Abstract to the R&R Other Project Information form in field 6.

(i) R&R Other Project Information Form - Project Narrative Instructions

Project Narrative – Describe clearly the research including the objective and approach to be performed keeping in mind the evaluation criteria listed in Section V of this announcement. Also briefly indicate whether the intended research will result in environmental impacts outside the laboratory, and how the proposer will ensure compliance with environmental statutes and regulations. Attach the proposal narrative to R&R Other Project Information form in field 7.

Project Narrative - Statement of Objectives – Describe the actual research to be completed, including goals and objectives, on one-page titled Statement of Objectives. This statement of objectives may be incorporated into the award instead of incorporating the entire technical proposal. Active verbs should be used in this statement (for example, “conduct” research into a topic, “investigate” a problem, “determine” to test a hypothesis). It should not contain proprietary information.

Project Narrative - Research Effort – Describe in detail the research to be performed. State the objectives and approach and their relationship and comparable objectives in progress elsewhere. Additionally, state knowledge in the field and include a bibliography and a list of literature citations. Discuss the nature of the expected results. The adequacy of this information will influence the overall evaluation. Proposals for renewal of existing support must include a description of progress if the proposed objectives are related.

Project Narrative – Principal Investigator (PI) Time. PI time is required. List the estimate of time the principal investigator and other senior professional personnel will devote to the research. This shall include information pertaining to other commitments of time, such as sabbatical or extended leave; and proportion of time to be devoted to this research and to other research. Awards may be terminated when the principal investigator severs connections with the organization or is unable to continue active participation in the research. State the number of graduate students for whom each senior staff member is responsible. If the principal investigator or other key personnel are currently engaged in research under other auspices, or expect to receive support from other agencies for research during the time proposed for AFOSR support, state the title of the other research, the proportion of time to be devoted to it, the amount of support, name of agency, dates, etc. Send any changes in this information as soon as they are known. Submit a short abstract (including title, objectives, and approach) of that research and a copy of the budget for both present and pending research projects.

Project Narrative – Facilities. Describe facilities available for performing the proposed research and any additional facilities or equipment the organization proposes to acquire at its own expense. Indicate government-owned facilities or equipment already possessed that will be used. Reference the facilities contract number or, in the absence of a facilities contract, the specific facilities or equipment and the number of the award under which they are accountable.

Project Narrative – Special Test Equipment. List special test equipment or other property required to perform the proposed research. Segregate items to be acquired with award funds from those to be furnished by the Government. When possible and practicable, give a description or title and estimated cost of each item. When information on individual items is unknown or not available, group the items by class and estimate the values. In addition, state why it is necessary to acquire the property with award funds.

Project Narrative – Equipment. Justify the need for each equipment item. Additional facilities and equipment will not be provided unless the research cannot be completed by any other practical means. Include the proposed life

expectancy of the equipment and whether it will be integrated with a larger assemblage of apparatus. If so, state who owns the existing apparatus.

Project Narrative – High Performance Computing Availability.

Researchers that are supported under an AFOSR grant or contract, and meet certain restrictions, are eligible to apply for special accounts and participation in a full-spectrum of activities within the DOD high performance computing modernization program. This program provides, at no cost to the user, access to a range of state-of-the-art high performance computing assets and training opportunities that will allow the user to fully exploit these assets. Details of the capabilities of the program can be found at the following Internet address: <http://www.hpcmo.hpc.mil>. Researchers needing high performance cycles should address the utilization of this program to meet their required needs. AFOSR program managers will facilitate the establishment of accounts awarded.

(j) R&R Budget Form - The financial portion of the proposal must contain a cost estimate for the proposed effort including a description of cost sharing arrangements, if any. Applicants should prepare three annual budgets and an aggregate 33-month budget beginning 01 Mar 2008 and ending 30 Nov 2010. Annual budgets will cover the following three periods:

Year 1 – 15 Mar 2008 through 30 Nov 2008

Year 2 – 1 Dec 2008 through 30 Nov 2009

Year 3 – 1 Dec 2009 through 30 Nov 2010

In addition to the Research & Related Budget forms available on Grants.gov, the budget proposal should include a budget justification for each year, clearly explaining the need for each item. Applicants who enter a fee on Part J of the budget will not be eligible to receive a grant or cooperative agreement. Should a grant be awarded AFOSR will make payments to educational and non-profit recipients based upon a predetermined payment schedule. Payments will normally be made quarterly in advance of performance, based upon a spending profile which must be provided as part of the proposal. Payments should be limited to the amounts needed to conduct research during each respective period. Educational and Non-profit organizations shall submit a spending profile with their cost proposal. Attach the budget justification and/or spending profile to Section K of the R&R Budget form. (<http://www.wpafb.af.mil/library/factsheets/factsheet.asp?id=9388>).

4. Other Submission Requirements

Proposals submitted in whole or in part by electronic media (computer disk or tape, facsimile machine, electronic mail, etc.) will not be accepted (unless the full proposal is submitted electronically through Grants.gov).

5. Application Receipt Notices.

a. For Electronic Submission - The applicant's approved account holder for grants.gov will receive a confirmation page upon completing the submission to Grants.gov. This confirmation page is a record of the time and date stamp that is used to determine whether the proposal was submitted by the deadline. A proposal received after the deadline is "late" and will not be considered for an award. After an institution submits an application, Grants.gov generates a submission receipt via email and also sets the application status to "Received". This receipt verifies the Application has been successfully delivered to the Grants.gov system. Next, Grants.gov verifies the submission is valid by ensuring it does not contain viruses, the opportunity is still open, and the applicant login and applicant DUNS number match. If the submission is valid, Grants.gov generates a submission validation receipt via email and sets the application status to "Validated". If the application is not validated, the application status is set to "Rejected". The system sends a rejection email notification to the institution and the institution must resubmit the application package. Applicants can track the status of their application by logging in to Grants.gov.

b. For Hard Copy Submission – An applicant that submits a hard copy proposal to AFOSR will receive an email from the agency approximately ten days after the proposal due date to acknowledge receipt of the proposal and provide the agency's assigned tracking number. The email is sent to the authorized representative for the applicant institution. A hard copy proposal received at an agency's listed mailing address after the deadline, if one is specifically listed in the announcement, is "late" and will not be considered for an award, except for cases in which there is acceptable evidence to establish that the proposal:

a. Was delivered to the agency and was under the agency's control prior to the deadline: or

b. Was sent to the agency's listed mailing address by the U.S. Postal Service Express Mail three or more business days prior to the date specified for the receipt of the proposals. The term "business days" excludes weekends and U.S. federal holidays.

6. Submission Dates and Times. Proposals must be received by 4:00 PM Eastern Standard Time 1 Feb 2008.

V. Application Review Information

AFOSR's overriding purpose in supporting this research is to advance the state of the art in areas related to the technical problems the Air Force encounters in developing and maintaining a superior Air Force; lowering the cost and improving the performance, maintainability, and supportability of Air Force weapon systems; and creating and preventing technological surprise.

Proposals submitted under this BAA are evaluated through a peer or scientific review process, and selected for award on a competitive basis according to Public Law 98-369, Competition in Contracting Act of 1984, 10 USC 2361, and 10 USC 2374. Proposals may be evaluated by program managers at EOARD/AOARD and the appropriate AFRL Technology Directorates. Additionally, proposals may be evaluated by outside evaluators retained by AFOSR which may include support contractor personnel. Proposals submitted for Special Programs listed in Section I shall be evaluated under criteria as specified in their description. Subject to funding availability, all other proposals will be evaluated under the following two primary criteria, of equal importance, as follows:

1. The scientific and technical merits of the proposed research.
2. The potential contributions of the proposed research to the mission of the USAF.

Other evaluation criteria used in the technical reviews, which are of lesser importance than the primary criteria and of equal importance to each other, are:

1. The likelihood of the proposed effort to develop new research capabilities and broaden the research base in support of U.S. national defense.
2. The proposer's, principal investigator's, team leader's, or key personnel's qualifications, capabilities, related experience, facilities, or techniques or a combination of these factors that are integral to achieving USAF objectives.
3. The proposer's and associated personnel's record of past performance.
4. The realism and reasonableness of proposed costs.

No further evaluation criteria will be used in source selection. The technical and cost information will be analyzed simultaneously during the evaluation process.

For conference support, please see the evaluation criteria listed under the heading of “Conferences and Workshops” under Section I of this announcement.

Proposals may be submitted for one or more topics or for a specific portion of one topic. A proposer may submit separate proposals on different topics or different proposals on the same topic. The U.S. Government does not guarantee an award in each topic area. Further, be advised that as funds are limited, otherwise meritorious proposals may not be funded. Therefore, it is important that proposals show strength in as many of the evaluation area as practicable for maximum competitiveness.

Technology sharing and transfer is encouraged; in this respect, AFOSR welcomes proposals that envision university-industry cooperation. Non-industry proposers are encouraged to specify in their technical proposals their interactions with industry and the Air Force Research Laboratory’s Technical Directorates, including specific points of contact. Cooperation with or use of facilities of the Air Force Research Laboratory is also encouraged. Personnel interaction (e.g., university faculty or students performing research at industry or Air Force Research Laboratory sites; industry or Air Force staff working in university laboratories) is viewed as highly desirable. Further information regarding the Air Force Research Laboratory may be viewed at <http://www.afrl.af.mil>.

VI. Award Administration Information

1. Award Notices.

Should your proposal be selected for award, the principal investigator will receive a letter from the Technical Directorate stating this information. This is not an authorization to begin work. Your business office will be contacted by the grant or contracting officer to negotiate the terms of your award.

2. Reporting Requirements.

Grants and cooperative agreements typically require annual and final technical reports, financial reports, and final patent reports. Contracts typically require annual and final technical and patent reports. Copies of publications and

presentations should be submitted. Additional deliverables may be required based on the research being conducted.

VII. Agency Contacts

Should you have questions about a technical research area, contact the program manager Persis Elwood at persis.elwood@afosr.af.mil. Should you have questions about the BAA or procedures for submission of a proposal, contact Ricky Christie at (703) 696-5968 or ricky.christie@afosr.af.mil.

VIII. Additional Information

1. The cost of proposal preparation in response to this Announcement is not considered an allowable direct charge to any resulting award. Such cost is, however, an allowable expense to the normal bid and proposal indirect cost specified in FAR 31.205-18, or OMB Circular A-21, Cost Principles for Educational Institutions or OMB Circular A-122, Cost Principles for Nonprofit Organizations.
2. Every effort will be made to protect the confidentiality of the proposal and any evaluations. The proposer must mark the proposal with a protective legend in accordance with FAR part 15.6, Use and Disclosure of Data, if protection is desired for proprietary or confidential information.
3. Only contracting or grants officers are legally authorized to bind the government.
4. Intellectual Property
 - a. Proposers shall identify all aspects of the intellectual property; technical data, hardware, and software that they plan to develop under this award for which the Government will acquire less than unlimited rights and to list specifically what the restrictions are. In the event that proposers do not submit such a list, the Government will assume that it automatically has unlimited rights to all intellectual property, technical data, hardware, and software developed under this award. Furthermore, the Government will assume that it has unlimited rights to all intellectual property, technical data, hardware, and software developed under this award that is not listed.
 - b. Proposers are advised that proposals containing restrictions on intellectual property are by nature less favorable and valuable to the government.

Restrictions will be considered in the evaluation process. If no restrictions are intended, then the proposer should state this fact.

5. AFOSR documents are available on the AFOSR website at <http://www.wpafb.af.mil/AFRL/afosr/>.
6. Responses should reference Broad Agency Announcement AFOSR BAA 2008-2.
7. Prospective awardee shall be registered in the CCR database prior to award, during performance, and through final payment of any award resulting from this announcement. Offerors may obtain information on registration and annual confirmation requirements via the Internet at <http://www.ccr.gov> or by calling 1-888-227-2423, or 269-961-5757.