BROAD AGENCY ANNOUNCEMENT
USAFA-BAA-2009-1
Research Interests of the United States Air Force Academy (USAFA)

TWO-STEP CALL ANNOUNCEMENT (CALL) 0005

FEDERAL AGENCY NAME: United States Air Force Academy, Space Physics and Atmospheric Research Center

BROAD AGENCY ANNOUNCEMENT TITLE: Research Interests of the United States Air Force Academy

BROAD AGENCY ANNOUNCEMENT NUMBER: USAFA-BAA-2009-1

BROAD AGENCY ANNOUNCEMENT TYPE: This is an initial announcement

CATALOG OF FEDERAL DOMESTIC ASSISTANCE (CFDA) NUMBER: 12.800

CALL ANNOUCEMENT TITLE: Use of Remote and In-Situ Measurements to Improve Understanding of the Basic Physics of the Ionosphere

CALL ANNOUNCEMENT (CALL) NUMBER: 0005

TECHNICAL POINT OF CONTACT: The technical point of contact for this CALL as outlined in the baseline BAA, Section l - Funding Opportunity Description (a)(4), is:

Matthew G McHarg, Ph.D.
USAF Academy Department of Physics
Director, Space Physics and Atmospheric Research Center
PH (719) 333-2460, FAX (719) 333-3182
E-mail: matthew.mcharg@us.af.mil

CONTRACTING POINTS OF CONTACT: The contracting points of contact for this CALL are:

Grants/Agreements Specialist**:**
Chelsea Gurwell, 10 CONS/LGCC, United States Air Force Academy, CO
Phone: 719-333-2849
Email: Chelsea.Gurwell@us.af.mil

Grants/Agreements Officer:
Richard A. Harper, 10 CONS/LGCC, United States Air Force Academy, CO
Phone: 719-333-3927
Email: Richard.Harper.5@us.af.mil

BACKGROUND: The Space Physics and Atmospheric Research Center (SPARC) at the United States Air Force Academy (USAFA) is seeking white papers involving novel ideas for remote and in-situ measurements of the ionosphere. Specifically, the center is looking for research assistance in measuring the current state of the ionosphere. The SPARC is also interested in better understanding how to use these measurements in order to forecast the future state of the ionosphere. In the past, the SPARC has used ground based remote measurements of the aurora, and the effects of auroral particle precipitation and joule heating on the neutral thermosphere, as well as in-situ measurements of ionospheric plasma density and temperature using simple electrostatic analyzers. Current efforts include solar imagery using deployable membrane telescopes. White papers on these and other research topics focused around ionospheric measurements are requested.

As the United States Air Force Academy prepares young men and women for service to our nation, it is essential they have as many educational research opportunities as possible. We are specifically looking for novel measurement techniques and capabilities suitable for inclusion in undergraduate research courses to facilitate cadet leadership development.

REQUIREMENT DESCRIPTION: The United States Air Force Academy is soliciting white papers/proposals for research under Section l - Funding Opportunity Description (a)(4), Bioenergy of the Broad Agency Announcement USAFA-BAA-2009-1 posted on 24 May 2012 specifically for "Use of Remote and In-Situ Measurements to Improve Understanding of the Basic Physics of the Ionosphere" in accordance with the attached Research Considerations document.

THIS WILL BE A TWO-STEP CALL ANNOUNCEMENT:

FIRST STEP: WHITE PAPERS

WHITE PAPER FORMAT: White papers submitted in response to this call should conform to the requirements found in USAFA-BAA-2009 (conformed through the most recent amendment) and also include a brief resume of the principle investigator and a rough order of magnitude of cost. Interested parties should visit Grants.Gov prior to submitting a white paper to ensure the parties have a current version of the BAA.

WHITE PAPER DUE DATE AND TIME: The due date for white papers submitted in response to this CALL is no later than 1630 MST on 23 June 2012. ***White papers received after the due date and time shall be governed by the provisions of FAR 52.215-1(c)(3).***

WHITE PAPERS ARE TO BE E-MAILED TO:
10 CONS/LGCC
Attn: Chelsea Gurwell in response to USAFA-BAA-2009-1 Call 0005
8110 Industrial Drive, Ste # 200
United States Air Force Academy, CO 80840
Fax: 719-333-4747
Email: 10CONS.LGCC@usafa.af.mil
WHITE PAPERS SHOULD ADDRESS ANY OR ALL OF THE PROGRAM

OBJECTIVES FOUND IN ATTACHMENT ONE OF THIS CALL.

WHITE PAPERS EVALUATED AND SELECTED: White papers will be evaluated and full proposals may be requested in accordance with USAFA-BAA-2009-1. Offerors whose white papers are determined to be of interest to the Government will be asked to submit full cost and technical proposals in response to this CALL. Offerors whose white papers are not of interest to the Government will be notified via letter that the effort proposed is not of interest to the Government.

SECOND STEP: PROPOSALS, IF REQUESTED BY THE GRANTS OFFICER

INTENT TO PROPOSE: Potential offerors are requested to advise the Grants/Agreements point of contact (by e-mail) if they intend to submit a proposal after receiving a formal request for proposal from the Grants Officer. Such notification is merely a courtesy and is not a commitment by the offeror to submit a proposal.

PROPOSAL INSTRUCTIONS: Offerors are requested to follow the instructions within the BAA (reference USAFA-BAA-2009-1), conformed through the latest amendment, for instructions on how to submit a proposal. All proposals must be submitted through Grants.Gov, https://www.grants.gov and include all the required forms information specified within the BAA.

REGISTRATION REQUIREMENTS: Prospective Recipients 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 www.ccr.gov or by calling 1-866-606-8220.

ANTICIPATED FUNDING: Anticipated funding for this Call is unknown at this time. This posting is not to be construed to mean the assurance of an award, as availability of funds, technical need, Government discretion and successful negotiations are prerequisites to award.

ANTICIPATED TYPE OF CONTRACTS/INSTRUMENTS: The Government anticipates awarding a Cooperative Agreement as a result of this CALL but reserves the right to award the instrument best suited to the nature of research proposed, including a Grant or Procurement Contract. Potential offerors are reminded that in accordance with DoDGARs 22.205, a fee or profit may not be paid to the recipient of a Cooperative Agreement or Grant.

PERIOD OF PERFORMANCE: The anticipated period of performance for the award resulting from this CALL is approximately 36 months, depending on the proposed effort.

PROPOSAL DUE DATE AND TIME: The due date for proposals will be 30 days after formal request for proposal has been sent by the Grants Officer to the submitter of the selected white paper(s). Proposals for any other technology area identified in the baseline BAA will not be accepted under this call. **Proposals received after the due date and time shall be governed by the provisions of FAR 52.215-1(c)(3).**

ANTICIPATED NUMBER OF AWARDS: The Government anticipates awarding one Cooperative Agreement as a result of this CALL. However, the Government reserves the right to make multiple awards, single awards, or no awards pursuant to this CALL.

AWARD DATE: Anticipated July/August 2012

CALL AMENDMENTS: Offerors should monitor **GRANTS.GOV** http://www.grants.gov for any additional notices to this CALL that may permit extensions to the white paper submission date or otherwise modify this announcement.

APPLICABILITY OF BASELINE BAA: All requirements of USAFA-BAA-2009-1 (as amended on Grants.Gov) apply unless specifically amended and addressed in this CALL. For complete information regarding USAFA-BAA-2009-1, refer to the initial opened-ended BAA as amended. It contains information applicable to all CALLS issued under the BAA and provides information on the overall program, proposal preparation and submission requirements, proposal review and evaluation criteria, award administration, agency contacts, etc. Direct questions to the points of contact identified above.

ATTACHMENT: Research Considerations

RESEARCH CONSIDERATIONS

FOR SCREENING, ANALYSIS, & DEVELOPMENT OF NOVEL REMOTE AND IN-SITU MEASUREMENTS OF THE IONOSPHERE

Space Physics and Atmospheric Research Center

Department of Physics

United States Air Force Academy

DATE: May 2012

1. GENERAL DESCRIPTION OF RESEARCH TO BE PERFORMED

The Space Physics and Atmospheric Research Center's (SPARC) primary mission is to support the Air Force Office of Scientific Research (AFOSR) basic research program though faculty and cadet research efforts. This potential cooperative agreement covers research into in-situ and remote measurements of the ionosphere. Specifically, the center is looking to expand research in measuring the current state of the ionosphere. The SPARC is also interested in better understanding how to use these measurements in order to forecast the future state of the ionosphere. We are seeking novel ideas suitable for involvement of cadets in research projects into ionospheric physics.

2. OBJECTIVES AND EXPECTATIONS OF RESEARCH

A. Plan and conduct experiments and computations, which investigate the current state of the ionosphere. Determination of basic physical parameters of the ionosphere such as density, temperature, winds, electric and magnetic fields and auroral precipitation will be given priority.

B. Research basic physical parameters of the middle atmosphere associated with transient luminous events such as sprites, halos, elves and gigantic jets. Optical and spectroscopic investigations of the energy input and plasma physical processes associated with streamer development and growth in the middle atmosphere.

C. Incorporate USAFA cadets in the above research through "team leadership" role in support of department academic 499 research projects and USAFA cadet summer research programs at an anticipated rate of at least one cadet project per semester. The recipient shall lead a team of 2-4 cadets studying ionospheric and mesospheric phenomena as part of the capstone physics 490 course.

D. Share or present the information regarding this project at scientific conferences and /or meetings and peer reviewed journals as availability of travel and funding for these conferences/meetings permits.

E. All final reports shall be submitted to the Director, Space Physics and Atmospheric Research Center for approval prior to submission to the Defense Technical Information Center (DTIC).

3. BACKGROUND INFORMATION

In the past, the SPARC has used ground based remote measurements of the aurora, and the effects of auroral particle precipitation and joule heating on the neutral thermosphere, as well as in-situ measurements of ionospheric plasma density and temperature using simple electrostatic analyzers. Past efforts also included remote measurements of thermospheric winds and temperatures for use in measuring the effects of neutrals on the plasma and vice versa. Current efforts include solar imagery using deployable membrane telescopes.

4. POSSIBLE KNOWN CONSTRAINTS

Because of the diversity of the partnerships within the SPARC, the recipient must coordinate, cooperate, and exhibit flexibility in working with a number of government, private and academic researchers, faculty and cadets at any given time in working on other programs in support of this effort and those of the SPARC. Although the recipient

will be collaboratively working as part of a research team, he/she shall complete projects individually. The recipient must maintain exemplary attention to cadet and faculty safety while working with laboratory equipment. While advanced understanding of the laboratory setting in terms of equipment, the recipient shall provide any necessary training or guidelines specific to their respective research areas. This work will be unclassified. It may or may not be ITAR depending upon the exact research proposed.

5. REQUIRED DELIVERABLES

The main objective of the SPARC for this project is to develop basic research, which identifies promising measurement techniques of the ionosphere and mesosphere suitable for involvement of undergraduate cadets.

As mentioned previously, this research can expand into different areas, which could involve a number of laboratory techniques and operations. The recipient shall report to SAPRC Director on the plans and progress of the investigations, present progress and findings to the Air Force Office of Scientific Research at annual AFOSR Conferences and Meetings, and present results at technical conferences. This work will be unclassified. It may or may not be ITAR depending upon the exact research proposed.

Typical collaborative tasks could involve the following sequence of events:

a. Definition of problem by professional staff
b. Develop experimental plan in consultation with professional staff
c. Research appropriate literature
d. Identify need for supplies and equipment to the appropriate government personnel for procurement
e. Assemble, test and verify apparatus
f. Perform research experiments and collect data, work while collaborating in an independent environment with senior level cadets
g. Record and report results in accordance with NSF, DoD and Air Force scientific standards
h. Analyze results in consultation with professional staff

Required deliverables include:

1. Quarterly Reports detailing the type of experiments used, dates of application and results, and the next phase of research to be conducted, to include the proposed approach and any other relevant data.

2. Regular informal progress meetings with the collaborating team of cadets, faculty, and researchers to share progress, trends, needs, challenges etc.

3. Presentation media and material for proposed conferences and /or meetings as applicable.

4. A final report regarding this study on a comprehensive basis, including but not limited to steps taken, research identified, data and results, suggestions for future experiments, etc. This report shall be submitted to the technical POC (SPARC Director), and the Agreements Officer. Upon acceptance of the final report, the recipient shall forward it to DTIC for documentation purposes.

6. GOVERNMENT FURNISHED PROPERTY

The following Government Furnished Property (GFP) is provided for right-of-use; however, this equipment will not be assigned to the recipient and shall remain in the SPARC laboratory:

- Vacuum chamber
- High speed cameras
- Electronics testing apparatus
- Various electrical power supplies including both high voltage and high current
- Ion sources
- Rotating vacuum stages
- Optical tables
- Design software appropriate to the intended research

The following GFP will be assigned to the recipient and they shall bear responsibility for this equipment:

- Desktop Computer

7. REQUIRED TRAVEL

Travel maybe required in support of this effort. Projected travel includes 1 to 2 professional conferences during this effort, and travel between USAFA and other educational institutions as required for consultation. An estimation of conferences and or meetings required of the recipient is below (this is an estimate and may be revised by the Government during performance of any resultant award):

American Geophysical Union Fall Meeting, San Francisco, CA
Coupling Energetics and Dynamics of Atmospheric Regions

In addition to conferences, travel may be required 2-3 times per year to support measurements associated with this research. Travel locations might include Poker Flat Research Range in Alaska, Langmuir Laboratory in Socorro New Mexico, and other field locations as required to successfully carry out the intended research.

7.1 The work defined in this cooperative agreement shall be performed principally at the United States Air Force Academy, Colorado. Some of the research may occur in the field. The government will reimburse the recipient for the unburdened direct cost of the travel. A fee/profit will not be paid on travel costs. All required travel shall be at the contractor's expense and shall be, upon completion, reimbursed by the Government to the contractor, IAW the Joint Travel Regulation (JTR). Foreign travel is not authorized under this agreement unless prior approval is obtained from the Grants Officer on a case by case basis; any such requests will require a minimum of 30 days' notice to the Government.

7.1.1. Travel Reimbursement. The Government will reimburse the recipient for expenses IAW the JTR, Vol. 2 and not to exceed the amounts specified in the JTR. The recipient shall provide the Government, upon request for reimbursement, a copy of all travel related receipts. All travel costs for lodging, meals and incidental expenses shall be based on the per diem rates noted in the JTR.

8. OPERATIONS SECURITY CONSIDERATIONS

The deliverables under this effort and any scientific or technical information obtained or provided under this effort have been identified as critical information and shall not be released either formally or informally to anyone without the written consent of the USAFA Scientific and Technologic Information Officer (STINFO).

9. ORGANIZATIONAL CONFLICT OF INTEREST (OCI) CONSIDERATIONS

The recipient will identify any potential or actual OCI in their white paper and/or proposal in accordance with FAR Part 9.5.

10. DATA RIGHTS

The Government has Government purpose rights to all deliverables under this effort. The U.S. Government will be given a royalty free, world-wide, nonexclusive, irrevocable license to use, modify, reproduce, release, perform, display or disclose any data for Government purposes. Appropriate markings should be affixed on any data delivered in accordance with the data rights clause in the agreement.

11. RESEARCH SCHEDULE

The recipient shall include in their research proposal a proposed milestone progress schedule. The schedule shall include start, periodic review and end dates. The schedule shall also detail the types of reports (verbal or written deliverables) that will be provided at each milestone. This schedule will double as an invoicing schedule. The technical POC or Research Center Director may request additional verbal reports as deemed necessary by the pace of the work.

The recipient shall plan approximately three months of closeout activities into their schedule and estimated budget. This includes, but is not limited to: final invention disclosure report, final patent/royalty report, final technical report, final business report, satisfactory completion of all milestones, DTIC reporting, property disposition, plant clearance, final voucher and payment, and final audit.

12. ESTIMATE OF EFFORT REQUIRED

This research is estimated to be a 36-month effort. Continuation throughout the period of performance is contingent on the availability of funds.