REVISED PROGRAM ANNOUNCEMENT

DEPARTMENT OF DEFENSE

Advanced Computing Initiative (ACI)

Fiscal Year 2012

Broad Agency Announcement W911NF-12-R-0010

**Issued by the U.S. Army Contracting Command-Aberdeen Proving Ground
Research Triangle Park Division on behalf of the
Army Research Office (ARO) and the National Security Agency (NSA)**

Initially Issued: July 2012

Amendment 1 Issued: August 2012

Proposals Due: September 12, 2012

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I. OVERVIEW OF THE FUNDING OPPORTUNITY:

A. Required Overview Content

1. Federal Agency Name(s):
This Department of Defense program will be administered through the U.S. Army Contracting Command-Aberdeen Proving Ground, Research Triangle Park Division on behalf of ARO and NSA.

2. Funding Opportunity Title:
Department of Defense Advanced Computing Initiative (ACI) Fiscal Year 2012

3. Announcement Type
Initial Announcement

4. Research Opportunity Number:
W911NF-12-R-0010

5. Catalog of Federal Domestic Assistance (CFDA) Number:
12.431, Basic, Applied, and Advanced Research in Science and Engineering

6. Response Dates:
All proposals must be received no later than 4:00 PM Eastern Time on 12 September 2012.

B. Additional Overview Information

This Broad Agency Announcement (BAA) which sets forth research areas of interest to the ARL-ARO and the NSA is issued under paragraph 6.102(d)(2) of the Federal Acquisition Regulation (FAR), and 10 USC 2358 which provides for the competitive selection of basic research proposals. Proposals submitted in response to this BAA and selected for award are considered to be the result of full and open competition and in full compliance with the provision of Public Law 98-369, "The Competition in Contracting Act of 1984" and subsequent amendments.

The Department of Defense agencies involved in this program reserve the right to select for award; all, some, or none of the proposals submitted in response to this announcement. The participating DoD agencies will provide no funding for direct reimbursement of proposal development costs. Technical and cost proposals (or any other material) submitted in response to this BAA will not be returned. It is the policy of participating DoD agencies to treat all proposals as sensitive, competitive information and to disclose their contents only for the purposes of evaluation.

Interested parties shall submit comments or questions via electronic mail to the following email address: vonetta.y.goodson.civ@mail.mil and include "BAA# W911NF-12-R-0010" in the subject line. Comments or questions submitted should be concise and reference the relevant part and paragraph of the BAA.

Questions regarding full proposals may be submitted between the time this announcement appears and 4:00 PM Eastern Time on 05 September 2012. Questions submitted after this time will not be answered and the due date for submission of full proposals (12 September 2012) will not be extended.

II. DETAILED INFORMATION ABOUT THE FUNDING OPPORTUNITY

A. Funding Opportunity Description

The ACI is a DoD-sponsored computer science research program initiated by the NSA and the ARL-ARO. It focuses on areas of strategic importance to U.S. national security policy. It seeks to increase the Department's intellectual capital in the computer sciences and improve its ability to address future challenges and build bridges between the Department and the computer science community. ACI brings together universities, research institutions, companies, and individual scholars and supports multidisciplinary and cross-institutional projects addressing specific topic areas determined by the Department of Defense. The ACI aims to promote research in specific areas of computer science and to promote a candid and constructive relationship between DoD and the computer science community.

Specifically, energy efficiency is now a first-class constraint in designing new supercomputers, and the challenge of rapidly failing system resilience is on the horizon. In order to provide reasonable performance across at least a small class of applications, future systems will need to be able to dynamically trade off energy efficiency, performance, and reliability. The ACI is meant to solicit ideas for enabling these tradeoffs. The ACI competition should explicitly target research related to one or more of the three (3) thrust areas listed below. Detailed descriptions of the areas can be found in Section H, "Specific Advanced Computing Initiative Research Thrusts." The detailed descriptions are intended to provide the applicant a frame of reference and are not meant to be restrictive. Innovative proposals related to these research topics are highly encouraged. Full proposals are solicited which address the following thrusts:

(1)   Machine Environment
(2)   Run-time Environment
(3)   Programming Environment

Proposals will be considered for both single-investigator awards as well as larger teams. A team of investigators may be warranted because the necessary expertise in addressing the multiple facets of the topics may reside within different organizations. The research questions addressed should extend across a fairly broad range of linked issues, where there is clear potential synergy among the contributions of the distinct disciplines represented on the team. Team proposals must name one Principal Investigator as the responsible technical point of contact. Similarly, one institution will be the primary recipient for the purpose of award execution. The relationship among participating institutions and their respective roles, as well as the apportionment of funds including sub-awards, if any, must be described in both the proposal text and the budget.

Historically Black Colleges and Universities (HBCU) [as determined by the Secretary of Education to meet requirements of Title III of the Higher Education Act of 1965, as amended (20 U.S.C. Sec. 1061)] and Minority Serving Institutions (MI) of Title V [as defined by 20 U.S.C. Sec. 1067k(3)] are encouraged to participate in the ACI program, either as single investigator applicants or as a member of a team. However, no specific funds are set aside for HBCU/MI participation under 10 USC Section 2362.

B. Award Information

It is anticipated the awards will be made in the form of contracts, grants, and cooperative agreements. The awards will be made at funding levels commensurate with the proposed research, investigator/team type, as well as availability of funding. The awards will contain a base period for twelve months and one option period for twelve months. The base and option period may be incrementally funded.

The total amount of funding for two years available for all contracts, grants, and cooperative agreements awards resulting from this ACI BAA is estimated to be about $4M per year, subject to the availability of out-year appropriations for the 12 month option period. These funds will be allocated between two investigator award types:

> **Single investigator small team awards:** It is anticipated that the single investigator awards will range from $30K to $500K per year, with typical awards in the range of $200K to $400K per year. Awards in the upper end of the range will be made only for extremely meritorious proposals.

> **Large team awards:** It is anticipated that the awards will range from $0.5M to $2M per year, with typical awards in the range of $1M to $1.5M per year. Awards in the upper end of the range will be made only for extremely meritorious proposals.

The actual amount of each award will be contingent on availability of funds, the specific topic, and the scope of the proposed work. Depending on the results of the proposal evaluation, there is no guarantee that any of the proposals submitted in response to a particular topic will be recommended for funding. On the other hand, more than one proposal may be recommended for funding for a particular topic.

The ACC-APG RTP Division has the authority to award a variety of instruments on behalf of ARL-ARO. The ACC-APG RTP Division reserves the right to use the type of instrument most appropriate for the effort proposed. Applicants should familiarize themselves with these instrument types and the applicable regulations before submitting a proposal. Following are brief descriptions of the possible award instruments.

1. Procurement Contract. A legal instrument, which, consistent with 31 U.S.C. 6303, which reflects a relationship between the Federal Government and a State Government, a local government, or other entity/contractor when the principal purpose of the instrument is to acquire property or services for the direct benefit or use of the Federal Government.

Contracts are governed by the following regulations:

    a. Federal Acquisition Regulation (FAR)

    b. Defense Federal Acquisition Regulation Supplement (DFARS)

    c. Army Federal Acquisition Regulation Supplement (AFARS)

2. Grant - A legal instrument that, consistent with 31 U.S.C. 6304, is used to enter into a relationship:

    a. The principal purpose of which is to transfer a thing of value to the recipient to carry out a public purpose of support or stimulation authorized by a law or the United States, rather than to acquire property or services for the DoD's direct benefit or use.

    b. In which substantial involvement is not expected between the DoD and the recipient when carrying out the activity contemplated by the grant.

    c. No fee or profit is allowed.

3. Cooperative Agreement - A legal instrument which, consistent with 31 U.S.C. 6305, is used to enter into the same kind of relationship as a grant (see definition "grant"), except that substantial involvement is expected between the DoD and the recipient when carrying out the activity contemplated by the cooperative agreement. The term does not include "cooperative research and development agreements" as defined in 15 U.S.C. 3710a. No fee or profit is allowed.

Grants and cooperative agreements are governed by the following regulations:

    a. 2 CFR Part 220, "Cost Principles for Educational Institutions" (Formerly OMB Circular A-21)

    b. 2 CFR Part 225, "Cost Principles for State, Local and Indian Tribal Governments" (Formerly OMB Circular A-87)

    c. OMB Circular A-102, "Uniform Administrative Requirements for Grants and Cooperative Agreements with State and Local Governments"

    d. 2 CFR 215, "Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations" (Formerly OMB Circular A-110)

    e. 2 CFR Part 230, "Cost Principles for Non-Profit Organizations" (Formerly OMB Circular A-122)

f. OMB Circular A-133, "Audits of States, Local Governments, and Non-Profit Organizations"

g. DoD Grant and Agreement Regulations (DoDGARs), DoD 3210.6-R

Copies of OMB regulations may be obtained from:

Executive Office of the President   Telephone: (202) 395-7332
Publications Service   FAX Requests: (202) 395-9068
New Executive Office Building   http://www.whitehouse.gov/OMB/grants
725 17th Street, N.W., Room 2200
Washington, DC   20503

An electronic copy of the DoDGARs may be found at
http://www.dtic.mil/whs/directives/corres/html/321006r.htm

C. Eligibility Information

1. Eligible Applicants:

This ACI competition is open to institutions of higher education (universities), including DoD institutions of higher education. Non-profit institutions, national laboratories and commercial entities may also submit a proposal in response to this announcement.

2. Cost Sharing or Matching:

There is no requirement for cost sharing, matching, or cost participation to be eligible for award under this BAA.

3. Dun and Bradstreet Universal Numbering System (DUNS) Number and Central Contractor Registrations (CCR):

Each applicant (unless the applicant has an exception approved by the agency under 2 CFR 25.110(d)) is required to: (a) Be registered in the CCR prior to submitting its application; (b) provide a valid DUNS number in its application; and (c) continue to maintain an active CCR registration with current information at all times during which it has an active Federal award or an application or plan under consideration by an agency.

An Agency receiving an application may not make an award to the applicant until the applicant has complied with all applicable DUNS and CCR requirements. If an applicant has not fully complied with the requirements by the time the agency is ready to make an award,

the agency may determine that the applicant is not qualified to receive an award and use that determination as a basis for making an award to another applicant.

D. Application and Submission Information

1. Address to View Broad Agency Announcement

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 select "Download Application Package." Enter the CFDA number, 12.431, Basic, Applied, and Advanced Research in Science and Engineering. You could also enter the funding opportunity number for this announcement, W911NF-12-R-0010.

2. Content and Form of Application Submission

a. General Information

The proposals submitted under this BAA must address unclassified fundamental research. Proposal submissions will be protected from unauthorized disclosure in accordance with applicable laws and DoD regulations. Applicants are expected to appropriately mark each page of their submission that contains proprietary information.

Important Note: Titles given to the Proposals should be descriptive of the work they cover and not be merely a copy of the research topics contained in the BAA.

b. Submission of a Full Proposal:

Full proposals shall be submitted electronically through www.grants.gov. Full proposals sent by fax or email will not be considered.

Registration Requirements for Grants.gov: Proposals must be submitted electronically through Grants.gov. There are several one-time actions your institution must complete in order to submit applications through Grants.gov (e.g., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number; register with the Central Contract Registry (CCR); register with the credential provider; register with Grants.gov; and obtain approval for an Authorized Organization Representative (AOR) to submit applications on behalf of the organization). Go to http://www.grants.gov/applicants/get_registered.jsp for further information. Use the Grants.Gov Organization Registration Checklist, which may be accessed at http://www.grants.gov/assets/OrganizationRegCheck.pdf to guide you through the process.

Applicants, who are not registered with CCR and Grants.gov, should allow at least 21 days to complete these requirements. It is suggested that the process be started as soon as possible.

Questions: Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or support@grants.gov.

VERY IMPORTANT – In order to view, complete, and submit an application package, you will need to download the appropriate software packages. Go to http://www.grants.gov/applicants/apply_for_grants.jsp for further information.

Submitting the Application

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 select "Download Application Package." Enter the CFDA number, 12.431, Basic, Research in Science and Engineering. You can also enter the funding opportunity number for this announcement, W911NF-12-R-0010.

Application Forms – The forms are contained in the Application Package available through the Grants.gov application process. Applicants must complete the mandatory forms and any optional forms that are applicable (e.g., SF-LLL Disclosure of Lobbying Activities) in accordance with the instructions on the forms and the additional instructions below. The required fields should be completed in accordance with the "pop-up" instructions on the forms. To activate the instructions, turn on the "Help Mode" (icon with the pointer and question mark at the top of the form). Files that are attached to the forms must be in Adobe Portable Document Form (PDF) unless otherwise specified in this announcement.

Form: SF 424 (R&R) (Mandatory)

The SF 424 (R&R) form is to be used as the cover page for all proposals. Complete this form first to populate data in other forms. By submitting an application through grants.gov, the Authorized Organization Representative (AOR) identified by username and password is providing an electronic signature. By signing the SF 424 (R&R), applicants are providing the certification required by 32 CFR Part 28 regarding lobbying as contained in this BAA. If you encounter problems, contact customer support at 1-800-518-4726 or support@grants.gov.

Form: Research & Related Other Project Information

Complete questions 1 through 6 and attach files for items 7 through 12 as applicable. The files must comply with the following instructions:

Project Summary/Abstract (Field 7 on the form)

The project summary must be a single page that identifies the research problem, proposed methods, anticipated outcome of the research, if successful, and impact on DoD capabilities or broader implications for national defense. It should identify the Principal Investigator, the institution (and other institutions involved in the team, if applicable), the proposal title, the topic number, and the total funds requested for the effort. The project summary must not exceed one page when printed using standard 8.5" by 11" paper with 1" margins (top, bottom, left and right) with a font no smaller than Times New Roman, 10 point. To attach a Project Summary/Abstract, click "Add Attachment." Pages in excess of the one page limit will not be considered.

Project Narrative (Field 8 on the form)

The following formatting rules apply for Field 8

- Paper size when printed - 8.5 x 11 inch paper
- Margins - 1 inch
- Spacing - single
- Font – No smaller than Times New Roman, 10 point
- Number of pages - no more than fifteen (15) single-sided pages.
  The cover, table of contents, list of references, letters of support, and curriculum vitae are excluded from the page limitations.
- Pages exceeding the limit will not be evaluated.

Include the following in Field 8

The narrative's first page must include the following information:

- Principal Investigator name
- Phone number, fax number, and e-mail address
- Institution, Department, Division
- Institution address
- Other institutions involved in the ACI team, if applicable
- Past or current DoD Contractor or Grantee? If yes, provide Agency, point of contact; number
- Proposal title
- Institution proposal number
- Topic number and topic title

- Table of Contents: List project narrative sections and corresponding page numbers.

- Technical Approach: Describe in detail the basic science research to be undertaken. State the objective and approach, including how data will be analyzed and interpreted. Discuss the relationship of the proposed research to the state-of-the-art knowledge in the field and to related efforts in programs elsewhere, and discuss potential scientific breakthroughs. Include appropriate literature citations/references. The literature citations and references are not included in the page count. Discuss the nature of expected results. Discuss potential applications to defense missions and requirements.

- Project Schedule, Milestones, and Deliverables: A summary of the schedule of events, milestones, and a detailed description of the results and products to be delivered.

- Management Approach: A discussion of the overall approach to the management of this effort, including brief discussions of: required facilities; relationships with any subawardees and with other organizations; availability of personnel; and planning, scheduling, and control procedures.

  (a)   Describe the facilities available for the accomplishment of the proposed research and related education objectives. Describe any capital equipment planned for acquisition under this program and its application to the proposed research. If possible, budget for capital equipment should be allocated to the first budget period of the grant. Include a description of any government furnished equipment/hardware/software/information, by version and/or configuration that are required for the proposed effort.

  (b)   Describe in detail proposed subawards to other eligible institutions or relevant collaborations (planned or in place) with other appropriate entities. Particularly describe how collaborations are expected to facilitate the transition of research results to applications. If subawards to other institutions are proposed, make clear the division of research activities, to be supported by detailed budgets for the proposed subawards.

  (c)   Designate one Principal Investigator for the award to serve as the primary point-of-contact. Briefly summarize the qualifications of the Principal Investigators and other key investigators to conduct the proposed research.

  (d)   Describe plans to manage the interactions among members of the proposed research team, if applicable.

  (e)   Identify other parties to whom the proposal has been, or will be sent, including agency contact information.

- Curriculum Vitae: Include curriculum vitae of the Principal Investigator and key co-investigators. The curriculum vitae are not included in the page count.

All applications should be in a single PDF file. To attach a Project Narrative in Field 8, click "Add Attachment."

Bibliography and References Cited (Field 9 on the form)
Attach a listing of applicable publications cited in above sections. The bibliography and references are not included in the page count.

Facilities and Other Resources (Field 10 on the form)

This field is not required.

Equipment (Field 11 on the form)

This field is not required.

Other Attachments (Field 12 on the form)

Attach budget proposal at Field 12. The budget must be attached as a PDF file. You must provide a detailed cost breakdown of all costs, by cost category, by the funding periods described below, corresponding to the proposed Technical Approach which was provided in Field 8 of the Research and Related Other Project Information Form. The option must be separately priced. The Research and Related Budget form is not required.

Annual budgets should be driven by program requirements. Elements of the budget should include:

- Direct Labor – Individual labor category or person, with associated labor hours and unburdened direct labor rates. Provide escalation rates for out years. Provide the basis for the salary proposed.

  Administrative and clerical labors – Salaries of administrative and clerical staff are normally indirect costs (and included in an indirect cost rate). Direct charging of these costs may be appropriate when a major project requires an extensive amount of administrative or clerical support significantly greater than normal and routine levels of support. Budgets proposing direct charging of administrative or clerical salaries must be supported with a budget justification which adequately describes the major project and the administrative and/or clerical work to be performed.

- Indirect Costs – Fringe benefits, overhead, G&A, etc. (must show base amount and rate). Provide the most recent rates, dates of negotiations, the period to which the rates apply, and a statement identifying whether the proposed rates are provisional or fixed. If the rates have been negotiated by a Government agency, state when and by which agency. Include a copy of the current indirect rate agreement.

- Travel – Identify any travel requirements associated with the proposed research and define its relationship to the project. List proposed destinations, cost estimate, and basis of cost estimate.

- Subawards – Provide a description of the work to be performed by the subrecipients. For each subaward, a detailed cost proposal is required to be included in the principal investigator's cost proposal. Fee/profit is unallowable if the instrument is a grant or cooperative agreement.

- Consultant – Provide consultant agreement or other document that verifies the proposed loaded daily/hourly rate. Include a description of the nature of and the need for any consultant's participation. Strong justification must be provided, and consultants are to be used only under exceptional circumstances where no equivalent expertise can be found at a participating university. Provide budget justification.

- Materials/Equipment – Specifically itemized with costs or estimated costs. An explanation of any estimating factors, including their derivation and application, shall be provided. Include a brief description of the applicant's procurement

method to be used (competition, engineering estimate, market survey, etc.). Provide budget justification.

- Other Directs Costs – Provide an itemized list of all other proposed other direct costs such as Graduate Assistant tuition, laboratory fees, report and publication costs and the basis for the estimate (e.g., quotes, prior purchases, catalog price lists).

Funding breakdown corresponding to the proposed Technical Approach which was provided in Field 8 of the Research and Related Other Project Information Form must also be attached.

Research and Related – Senior/Key Person Profile Form

Attach statements of current and pending support for the Principal Investigators and co-investigators listed in the proposal, as applicable. These statements require that each investigator specify all grants and contracts through which he or she is currently receiving or may potentially receive financial support. Describe the research activities and amount of funding. Biographical sketches are required for the Principal Investigator and for other key personnel. Please be sure to include education and years.

3. **Submission Dates and Times:**

Proposals are due no later than 4:00 p.m. Eastern Time on Wednesday, 12 September 2012.

Applicants are responsible for submitting electronic proposals in sufficient time to allow them to reach Grants.gov by the time specified in this BAA. If the electronic proposal is received by Grants.gov after the exact time and date specified for receipt of offers, it will be considered "late" and will not be considered for award. Acceptable evidence to establish the time of receipt by Grants.gov includes documentary evidence of receipt maintained by Grants.gov.

Because of potential problems involving the applicants' own equipment, to avoid the possibility of late receipt and resulting in ineligibility for award consideration, it is strongly recommended that proposals be uploaded at least two days before the deadline established in the BAA.

If an emergency or unanticipated event interrupts normal Government processes so that proposals cannot be received at grants.gov by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation closing date, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

Proposal Receipt Notices – After a proposal is submitted to Grants.gov, the AOR will receive a series of three emails from Grants.gov. The first two emails will be received within 24 to 48 hours after submission. The first email will confirm receipt of the application by the Grants.gov system and the second will indicate that the application has either been successfully validated by the system prior to transmission to the grantor agency or has been rejected due to errors. A third email should be received once the agency has confirmed receipt of the proposal. The document, Tracking Your Application Package, located at http://www.grants.gov/assets/TrackingYourApplicationPackage.pdf explains this process. The proposal is not considered received until the AOR receives email #3.

4. Intergovernmental Review

Not Applicable

5. Funding Restrictions:

The total amount of funding for two years available for all contracts, grants, and cooperative agreements awards resulting from this ACI BAA is estimated to be about $4M per year, subject to the availability of out-year appropriations for the 12 month option period.

6. Other Submission Requirements:

An applicant may withdraw a proposal at any time before award by written notice or by email. Notice of withdrawal shall be sent to the Contracting/Grants Officer identified in Section G, of this BAA. Withdrawals are effective upon receipt of notice by the Contracting/Grants Officer.

E. Application Review Information:

1. Criteria:

Full proposals responding to this BAA in each topic area will be evaluated using the following criteria, listed in descending order of importance

(1) scientific merit, soundness, and programmatic strategy of the proposed basic research; and

(2) relevance and potential contributions of the proposed research to the topic research area.

(3) the qualifications and availability of the Principal Investigators and key co-investigators;

(4) the applicant's record of past performance.

(5) realism and reasonableness of cost (cost sharing is not a factor in the evaluation). However, if an applicant would like they can propose cost sharing. Cost sharing may support items such as salaries, indirect costs, operating expenses, or new equipment. In each category, show the amount and nature of the planned expenditure share (e.g., equipment, faculty release time for research, etc.). A signed statement of commitment regarding the cost sharing or matching funds described above must be obtained from the appropriate institutional and/or private sector officials, and included at time of submission. The cost sharing or matching plan should be included in the budget justification.

Decisions for exercising the option period will be based on accomplishments during the base year and potential research advances during the option year that can impact DoD research priorities and capabilities.

2. Review and Selection Process:

Full proposals will undergo a multi-stage evaluation procedure. The respective topic evaluation panels will review proposals first. Cost proposals will be evaluated by Government business professionals and support contractors. Restrictive notices notwithstanding, one or more support contractors may be utilized as subject-matter-expert technical consultants. However, proposal selection and award decisions are solely the responsibility of Government personnel. Each support contractor's employee having access to technical and cost proposals submitted in response to this BAA will be required to sign a non-disclosure statement prior to receipt of any proposal submission. Findings of the evaluation panels will be forwarded to senior DoD officials who will make funding recommendations. Each proposal will be evaluated based on all evaluation criteria rather than against other proposals for research in the general area.

Due to the nature of the Advanced Computing program, the evaluation panels and reviewing officials may on occasion recommend that less than an entire proposal be selected for funding. This may be due to several causes such as insufficient funds, research overlap among proposals received, or potential synergies among proposals under a research topic. In such cases, proposal adjustments will be agreed by the applicant and the government prior to final award.

3. Recipient Qualification

The Federal Awardee Performance and Integrity Information System (FAPIIS) only applies to contracts and will be checked prior to making an award. The web address is: https://www.fapiis.gov/fapiis/govt/fapiispubaccessmain.jsp. This does not apply to assistance awards. The applicant representing the entity may comment in this system on any information about itself that a Federal Government Official entered. The information in FAPIIS will be used in making a judgment about the entity's integrity, business ethics, and record of performance under Federal awards that may affect the official's determination that the applicant is qualified to receive an award.

F. Award Administration Information:

1. Award Notices:

Notification of selection of proposals will be e-mailed to successful applicants about mid November 2012. Unsuccessful applicants will be notified shortly thereafter.

The notification e-mail must not be regarded as an authorization to commit or expend funds. The Government is not obligated to provide any funding until a Government Contracting/ Grants Officer signs the grant, cooperative agreement or contract award document.

Applicants whose proposals are recommended for negotiation of award will be contacted by a Contract/Grant Specialist to discuss additional information required for award. This may include representations and certifications, revised budgets or budget explanations, certificate of current cost or pricing data, subcontracting plan for small businesses, and other information as applicable to the proposed award.

2. Administrative and National Policy Requirements:

CCR - Successful applicants not already registered in the Central Contractor Registry (CCR) will be required to register in CCR prior to any award resulting from this BAA. Information on CCR registration is available at www.ccr.gov.

Certifications – Grant awards greater than $100,000 require a certification of compliance with a national policy mandate concerning lobbying. Grant applications shall provide this certification by electronic submission of SF424(R&R) as a part of the electronic proposal submitted via Grants.gov (complete Block 17). The following certification applies to each applicant seeking federal assistance funds exceeding $100,000.

<u>**Certification Regarding Lobbying Activities**</u>

(1) No Federal appropriated funds have been paid or will be paid by or on behalf of the applicant, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the Federal contract, grant, loan, or cooperative agreement, the applicant shall complete and submit Standard Form-LLL, "Disclosure Form to Report

Lobbying," in accordance with its instructions.

(3) The applicant shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, title 31, U.S.C. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Use and Protection of Human Subjects in Research

All research involving human subjects must be conducted in accordance with 32 CFR 219, 10 U.S.C. 980, and DoDI 3216.02, as well as other applicable federal and state regulations. Contractors/grantees must be cognizant of and abide by the additional restrictions and limitations imposed on the DoD regarding research involving human subjects, specifically as regards vulnerable populations (32 CFR 219 modifications to subparts B-D of 45 CFR 46), recruitment of military research subjects (32 CFR 219), and surrogate consent (10 U.S.C. 980). The regulations mandate that all DoD activities, components, and agencies protect the rights and welfare of human subjects of study in DoD-supported research, development, test and evaluation, and related activities hereafter referred to as "research". The requirement to comply with the regulations applies to new starts and to continuing research.

Military Recruiting

For Assistance Instruments Only. This is to notify potential applicants that each grant or cooperative agreement awarded under this announcement to an institution of higher education must include the following term and condition:

"As a condition for receipt of funds made available by the Department of Defense (DoD) under this award, the recipient agrees that it is not an institution of higher education (as defined in 32 CFR part 216) that has a policy of denying, and that it is not an institution of higher education that effectively prevents, the Secretary of Defense from obtaining for military recruiting purposes: (A) entry to campuses or access to students on campuses or (B) access to directory information pertaining to students. If the recipient is determined, using the procedures in 32 CFR part 216, to be such an institution of higher education during the period of performance of this agreement, and therefore to be in breach of this clause, the Government will cease all payments of DoD funds under this agreement and all other DoD grants and cooperative agreements to the recipient, and it may suspend or terminate such grants and agreements unilaterally for material failure to comply with the terms and conditions of award."

If your institution has been identified under the procedures established by the Secretary of Defense to implement Section 558, then: (1) no funds available to DoD may be provided to your

institution through any grant, including any existing grant, (2) as a matter of policy, this restriction also applies to any cooperative agreement, and (3) your institution is not eligible to receive a grant or cooperative agreement in response to this solicitation.

For Contracts Only. This is to notify potential applicants that each contract awarded under this announcement to an institution of higher education shall include the following clause: Defense Federal Acquisition Regulation Supplement (DFARS) clause 252.209-7005, Military Recruiting on Campus.

Subcontracting

 For Contracts Only. This section is applicable to contracts where the dollar threshold is expected to exceed to $650,000.00. Pursuant to Section 8(d) of the Small Business Act [15 U.S.C. 637(d)], it is the policy of the Government to enable small business concerns to be considered fairly as subcontractors under all research agreements awarded to prime contractors. The required elements of the Subcontracting Plan are set forth by FAR 52.219-9 and DFARS 252.219-7003. The applicant's plan shall depict the percentage values of the option requirements separately. The information in the SB Subcontracting Plan must properly correlate with that of the applicant's SB Participation Plan. The Government's subcontracting goals for Fiscal Year 2012 (FY12) are listed below, future year goals can be found at: http://www.acq.osd.mil/osbp/gov/sbProgramGoals.shtml.

Subcontracting Plan Goals. The applicant is requested to consider, when appropriate, the Government's subcontracting goals. The goals for FY12 are as follows:
Small Business 35%
Small Disadvantaged Business 5%
Women-Owned Small Business 3%
HUBZone Small Business: 3%
Service-Disabled Veteran-Owned Small Business 3%
Historically Black Colleges/Universities or Minority Serving Institutions 3%

Online Representations and Certifications Application (ORCA)

Certifications Required for Contract Awards. Certifications and representations shall be completed by successful applicants prior to award. Federal Acquisition Regulation (FAR) Online Representations and Certifications Application (ORCA) is at website http://orca.bpn.gov. Defense FAR Supplement and contract specific certification packages will be provided to the contractor for completion prior to award.

3. Reporting:

In general, for each award, annual progress reports and a final progress report are required which summarize the technical progress and accomplishments during the performance period. Specific reporting requirements will be included in each resulting award.

G. Agency Contacts:

A Research Topic Chief is identified for each specific ACI thrust area. Questions of a technical nature shall be directed to the Research Topic Chief identified in Section H of this BAA. Questions of a programmatic nature shall be directed as specified below:

Advanced Computing Initiative Program Point of Contact:
    Dr. J. Michael Coyle
    Army Research Office
    Email Address: Joseph.M.Coyle14.civ@mail.mil

Questions of a business nature shall be directed to the cognizant Grants/Contracting Officer, as specified below:

    Ms. Vonetta Goodson
    Contracting/Grants Officer
    Email address: Vonetta.Y.Goodson.civ@mail.mil

H. Other Information:

1.   Department of Defense High Performance Computing Program

The DoD High Performance Computing Program (HPCMP) furnishes the DoD S&T and DT&E communities with use-access to very powerful high performance computing systems. Recipients of DoD contracts, grants, and assistance instruments may be eligible to use HPCMP assets in support of their funded activities if program manager approval is obtained and if security/screening requirements are favorably completed. Additional information and an application may be found at www.hpcmo.hpc.mil/.

2.   Specific Advanced Computing Initiative Research Thrusts

Background

Over the past few decades, exponential growth in computing power, i.e. "supercomputing," has provided an enabling technology to address a wide class of NSA and Army critical applications. The growing computational power of supercomputers has come primarily, first, from a doubling of clock frequency, i.e. technological advances, and then by an increase in the number of processors.

Increased performance has been the driving force behind these advances and this increased performance has come at a higher cost. So a "trade-off" must be made between cost and performance. However, the costs of high-performance computing traditionally have focused on the cost of acquiring the big machines while the costs of maintenance, power and people have been ignored. The belief being that the increase in such costs is relatively small and balanced by the increased performance. Also, reliability has not been a real issue as these new supercomputer architectures have proven to be as reliable as past systems.

The days of "performance at all costs" are coming to an end, however, as the costs associated with consuming megawatts of electricity both directly and for the elaborate cooling systems that are required to deal with the excessive heat supercomputers generate are becoming excessive. It is estimated that the cost of energy to run a cluster equals the purchase cost in less than 18 months and the cost of provisioning a machine room with adequate power is typically many times the cost of the cluster.

More important is the machine's reliability which is always a concern but hasn't been a real issue to date. However, more power to the system means more heat to the system components. It has been shown that as processor temperatures increase by 10 degrees C., failure rates double. Computer down-time can be extremely costly both in terms of money and man-hours. For example, hourly losses when servers go down for a typical computing-intensive business can range up to $6.5 million. The ever increasing reliance on computing power coupled with a greater chance of failure is a recipe for disaster.

Developing hardware and software infrastructure to increase performance while ignoring the effects on power consumption and reliability will not be feasible in the future. Energy efficiency and reliability must now be considered as part of the "costs" when determining the trade-off between cost and performance. For example, Monte Carlo simulation is an important analysis tool to DoD in many application areas. Such simulations normally involve a large number of computer runs. Because the number of runs is so large, a small number of runs being "incorrect" is tolerable. What is tolerable is usually user defined but, in general, the challenge is to keep the order of the error of the overall simulation small (say 10^{-14}) and unaffected by any individual run. However if significant power reduction is achieved, a higher order error (say 10^{-11}) in the overall simulation may be acceptable.

Moreover, because of the varied and dynamic nature of the problems that present and future computers must face, future systems must be adaptable and be able to perform these trade-offs dynamically depending on problem and user circumstances. That is to say, in order to provide reasonable performance across at least a small class of applications, future systems will need to be able to dynamically trade off energy efficiency, performance, and reliability. The purpose of this BAA is to solicit ideas for enabling these tradeoffs.

Both hardware environment and software environment approaches to enabling these trade-offs will be considered. At this preliminary stage, however, the intent is for hardware and software solutions to remain separate with integration to be performed under a later solicitation. Due to the difficulty with efficiently programming some of the newer architectures, such as multi-core processors, the programming environment will also be broken out as a separate thrust. Thus this BAA will be divided into three thrust areas aligned with the particular computer environment in which the solution resides: machine environment, run-time environment, and programming environment.

Technical Thrusts

The technical scope of the joint NSA/ARL-ARO initiative is defined along the following thrust areas: machine environment, run-time environment, and programming environment. Each approach in all thrust areas needs to define the trade-offs being made between energy efficiency, performance, and reliability.

1. Machine Environment

For the purposes of this BAA, "machine environment" is meant to be a comprehensive term for all of the physical parts of a computer, as distinguished from the data it contains or operates on, and the software that provides instructions for the hardware to accomplish tasks. Most hardware solutions would be addressing problems in the machine environment thrust. All levels of hardware and architecture will be explored under this BAA, e.g.,
• 	Chip/node – processor, memory, SERDES, etc.
• 	Node/Interconnect – NIC, router, switch
• 	System – power distribution and conditioning, cooling, file system (IO and storage).

Possible questions that solutions in the machine environment will need to address are:
• 	What is it possible to do in this tradeoff space, e.g., how far can you push power consumption in either direction?
• 	What is the impact of one parameter on the other parameters, especially the impact of energy efficiency on performance and/or reliability?
• 	How do you dynamically control these parameters in hardware?
This is not an all-inclusive list, but it is provided to help potential authors to target their proposals appropriately.

Research Topic Chief: Mr. David Mountain, djmount@lps.umd.edu

2. Run-time Environment

As soon as a software program is executed, it is in a runtime state. In this state, the program can send instructions to the computer's processor and access the computer's memory (RAM) and other system resources. A run-time environment (also called runtime system or just runtime) is a configuration of hardware and software designed to support the execution of computer programs written in some computer language. The run-time system contains implementations of basic low-level commands and may also implement higher-level commands and may support type checking, debugging, and even code generation and optimization. Some services of the run-time system are accessible to the programmer through an application programming interface, but other services (such as task scheduling and resource management) may be inaccessible.

Possible questions solutions in the run-time environment will need to address are:

• 	How do you monitor the components to understand where they are in their 3D space where the axes are energy efficiency, performance, and reliability?
• 	How do you control the components to place them at a certain point in their 3D space?
• 	What information is provided to and needed from the programming environment?

This is not an all-inclusive list, but it is provided to help potential authors to target their proposals appropriately.

Research Topic Chief: Dr. Taiching Tuan, taiching.tuan@us.army.mil

3. Programming Environment

For the purposes of this BAA, the programming environment is both the computer software that assists computer programmers in developing a computer program along with the actual program itself. Software applications such as GUI builders, text or code editors, compilers and/or interpreters and debuggers are examples of possible tools in the programming environment. Most software solutions would be addressing problems in the programming environment thrust.

Possible questions solutions in the programming environment will need to address are:
•   What does the programmer "see," i.e., how are the trade-offs exposed to the programmer?
•   What is explicitly controlled and how?
•   What is implicitly controlled and how?
This is not an all-inclusive list, but it is provided to help potential authors to target their proposals appropriately.

Research Topic Chief: Ms. Lauren Smith, lauren.l.smith@ugov.gov