Broad Agency Announcement

High-Assurance Cyber Military Systems (HACMS)

DARPA-BAA-12-21

February 23, 2012

Defense Advanced Research Projects Agency
3701 North Fairfax Drive
Arlington, VA 22203-1714

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Part I: Overview

- **Federal Agency Name:** Defense Advanced Research Projects Agency (DARPA), Information Innovation Office (I2O)

- **Funding Opportunity Title:** High-Assurance Cyber Military Systems (HACMS)

- **Announcement Type:** Initial Announcement

- **Funding Opportunity Number:** DARPA-BAA-12-21

- **Catalog of Federal Domestic Assistance Numbers (CFDA):** 12.910 Research and Technology Development

- **Dates**
    - Posting Date: see announcement at www.fbo.gov
    - Proposal Due Date
        - Initial Closing: April 10, 2012, 12:00 noon (ET)
        - Final Closing: July 10, 2012, 12:00 noon (ET)
    - Proposer's Day: February 21, 2012, 10:00 AM EST

- **Anticipated Individual Awards:** DARPA anticipates multiple awards in each of Technical Areas 1-4, and one or more awards for Technical Area 5.

- **Types of Instruments that May be Awarded:** Procurement contract, cooperative agreement or other transaction.

- **Technical POC**: Dr. Kathleen Fisher, Program Manager, DARPA/I2O

- **BAA Email**: HACMS@darpa.mil

- **BAA Mailing Address**:

	Beginning April 2, 2012
DARPA/I20	DARPA/I2O
ATTN: DARPA-BAA-12-21	ATTN: DARPA-BAA-12-21
3701 North Fairfax Drive	675 North Randolph Street
Arlington, VA 22203-1714	Arlington, VA 22203-2114

- **I2O Solicitation**
  Website: http://www.darpa.mil/Opportunities/Solicitations/I2O_Solicitations.aspx

Part II: Full Text of Announcement

I. FUNDING OPPORTUNITY DESCRIPTION

The Defense Advanced Research Projects Agency (DARPA) is soliciting innovative research proposals in the area of the clean-slate development of software for high-assurance cyber-physical systems. Proposed research should investigate innovative approaches that enable revolutionary advances in science or systems. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

DARPA often selects its research efforts through the Broad Agency Announcement (BAA) process. This BAA is being issued, and any resultant selection will be made, using procedures under Federal Acquisition Regulation (FAR) Part 35.016 (DoDGARS Part 22 for Cooperative Agreements). Any negotiations and/or awards will use procedures under FAR 15.4, Contract Pricing, as specified in the BAA (including DoDGARS Part 22 for Cooperative Agreements). Proposals received as a result of this BAA shall be evaluated in accordance with evaluation criteria specified herein through a scientific/technical review process. The BAA will appear first on the Federal Business Opportunities website, http://www.fedbizopps.gov/, and the Grants.gov website at http://www.grants.gov/. The following information is for those wishing to respond to the BAA.

Introduction

Embedded systems form a ubiquitous, networked, computing substrate that underlies much of modern technological society. Examples include: supervisory control and data acquisition (SCADA) systems, medical devices, computer peripherals, communication devices, and vehicles. Such devices have been networked for a variety of reasons. Researchers and hackers have shown that these kinds of networked embedded systems are vulnerable to remote attack and that such attacks can cause physical damage while hiding the effects from monitors. This threat is of particular concern to the Department of Defense (DoD) because military cyber-physical systems are high-profile attack targets.

The goal of the High-Assurance Cyber Military Systems (HACMS) program is to create technology for the construction of *high-assurance,* cyber-physical systems, where high assurance is defined to mean functionally correct and satisfying appropriate safety and security properties. Achieving this goal requires a fundamentally different approach from what the software community has taken to date. Consequently, HACMS will adopt a clean-slate, formal methods–based approach that enables semi-automated code synthesis from executable, formal specifications. In addition to generating code, such a synthesizer will produce a machine-checkable proof that the generated code satisfies the functional specification as well as security and safety policies. A key technical challenge is the development of techniques to ensure that such proofs are composable, allowing the construction of high-assurance systems out of high-assurance components.

Background

In 2008, there were approximately 30 embedded processors per person in developed countries, and in 2009, 98% of microprocessors were in embedded systems. Such systems range from large SCADA systems that manage physical infrastructure to medical devices such as pacemakers and insulin pumps, to computer peripherals such as printers and routers, to communication devices such as cell phones and radios, to vehicles such as airplanes and satellites. Modern automobiles are another example, each of which contains 30-100 electronic control units (ECUs) that collectively control most of the functionality of the vehicle.

Embedded systems are being networked for a variety of reasons, including the ability to conveniently access diagnostic information, perform software updates, provide innovative features, lower costs, and improve ease of use. To a first approximation, air-gapped systems no longer exist.

Networked, embedded systems are vulnerable to remote attack. Exploits have resulted in the theft of water (Gignac Canal System in France), the release of raw sewage (Maroochy Shire Sewage plant in Australia), the delivery of incorrect dosages of insulin, printers catching on fire, interference with a Landsat-7 earth observation satellite, and computer viruses infecting the ground-control systems of the Predator and Reaper remotely piloted aircraft. In the commercial automotive space, researchers have demonstrated that it is possible to remotely take over all of the software-controlled functionality of a typical American sedan, which includes braking and acceleration. Such vulnerabilities arise primarily because there are bugs in the software components of the device's interfaces and because the control systems naively assume they are isolated from all external threats. Many of these systems share a common structure: they utilize an insecure cyber platform built from standard software components to support control systems designed to ensure safety, but not security.

Experiences with past *safety* failures of software-controlled systems can be used to estimate the potential economic and national security consequences of *security* vulnerabilities in such systems. For example, in 1999, software failures were partially responsible for the release and explosion of 237 thousand gallons of gasoline in Bellingham, WA, leading to three deaths and cleanup costs in excess of $45 million. The Department of Energy estimates that the August 14, 2003, Northeast Blackout resulted in losses in excess of $6 billion for two days of power outages. The Chernobyl Nuclear Disaster on April 26, 1986, resulted in costs in excess of $235 billion.

Traditionally, security for embedded systems has been based on air gaps and obscurity. The trend to network such systems and the need for software updates means the air gaps have disappeared. Furthermore, security analyses of modern automobiles and SCADA systems show that the cost of reverse engineering such systems is low. Consequently, neither air gaps nor obscurity will provide security in the long-term.

The state of the practice of security for traditional IT systems is anti-virus scanning, intrusion detection systems, and a patching infrastructure.[1] This approach does not work well in the IT

[1] Note that HACMS is only concerned with logical, software-based security, not physical security.

space for a variety of reasons, including its focus on known vulnerabilities and the fact that security code can itself introduce new vulnerabilities. Attempts to port these approaches to embedded systems are unlikely to be any more successful because embedded systems impose additional difficulties. Specifically, embedded systems often:

- Have strict resource constraints, for example, low memory capacity, low power consumption, limited data-processing capabilities, and low cost requirements;
- Have hard real-time performance requirements;
- Require reliability over long periods of time (e.g., operate for years without access to upgrades and patches); and
- Require extensive verification and validation before patches can be installed.

The goal of the HACMS program is to create technology for the construction of *high-assurance* cyber-physical systems, where high assurance is defined to mean functionally correct and satisfying appropriate safety and security properties. For purposes of concreteness, HACMS will focus on cyber-physical systems in the vehicle space, but it is anticipated that the tools and techniques will be relevant to other kinds of systems as well. The new technology will be embodied in a set of publicly available tools integrated into a formal-methods workbench for high-assurance software, which will be widely distributed for use in both the commercial and defense software sectors. HACMS will: (1) use these tools to generate open-source, high-assurance operating systems and control system components, and (2) use these components to construct high-assurance military vehicles.

Program Description and Structure

The HACMS program is structured as a 4.5-year effort, split into three 18-month phases. The program has five Technical Areas:

1. Military Vehicle Experts
2. Operating Systems
3. Control Systems
4. Research Integration
5. Red Team

The HACMS program will be a collective effort involving all the participants. Early in Phase 1, performers in Technical Areas 1 through 4 will be grouped into one or more design teams by the Government Team, each aimed at producing a high-assurance vehicle. Performers may participate on more than one team, and the teams will not be competitively evaluated. There is no anticipated down-selection of either teams or individual performers. The Red Team performer will conduct baseline assessments of target vehicles at the beginning of the program before any modifications are made. Each phase will culminate with an integration point, at which complete vehicles will be assembled, analyzed, and assessed (adversary-based assessment for defensive purposes) by the Red Team performer. There may also be occasions during each phase where smaller subsets of the vehicle will be assembled, analyzed, and assessed by the Red Team performer.

Performers may have an Associate Contractor Agreement clause included in their award to facilitate the open exchange of information. This clause is intended to ensure appropriate

coordination and integration of work by the HACMS contractors, while maximizing commonality and preventing unnecessary duplication of effort.

The goal of the HACMS program is to create tools and techniques that can produce formally verified software for defense vehicles. To reach this goal, HACMS will explore a clean-slate, formal methods-based approach that enables semi-automated code synthesis from executable, formal specifications. In addition to generating code, such a synthesizer will also produce a machine-checkable proof that the generated code satisfies the functional specification as well as security and safety policies. A key technical challenge is the development of techniques to ensure that such proofs are composable, allowing the construction of high-assurance systems out of high-assurance components. Compatibility and legacy concerns are secondary. Approaches that require changes to the underlying hardware are discouraged; logically unsound approaches are not in scope.

As illustrated in Figure 1 below, the envisioned approach comprises five key elements: a synthesizer, formal specifications (blue boxes), verified libraries, generated code and accompanying proof, and diagnostic information. The synthesizer for a particular domain takes as inputs safety and security policies, a functional specification, a description of the target hardware, resource constraints, and a description of the physical environment the system is to run in. Verified libraries allow the synthesizer to incorporate previously generated and/or handwritten pieces of code. The proof shows that the generated executable implements the functional specification and satisfies the safety and security policies as well as the resource constraints when run on hardware satisfying the hardware description and in an environment satisfying the environmental description. If the synthesizer is unable to produce code, it instead outputs diagnostic information detailing why it got stuck, enabling the user to respond appropriately, either by modifying one of the input specifications, writing and verifying a piece of the code by hand, or providing hints to the synthesizer. It is anticipated that different synthesizers may be necessary for different components.

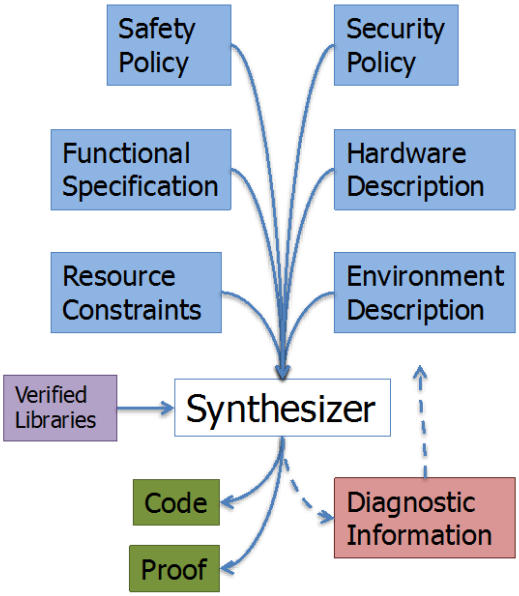

Figure 1. HACMS Clean-Slate Approach

This approach may help in coping with system evolution. If a new piece of functionality is required, the user can extend the functional specification to describe the new feature and then re-run the synthesizer. If the code needs to be ported to a new piece of hardware, the synthesizer can be given a description of the new hardware and re-run. An ancillary benefit is that executable functional specifications enable early validation, allowing potentially expensive design flaws to be caught early in the development process.

Because program synthesis is fundamentally a problem of searching a space of candidate programs to optimize performance metrics subject to resource constraints, it is likely that the synthesizers will be able to produce multiple program versions satisfying the same specifications. Such diversity will provide additional security since an attacker would need a different approach to break into each version. In addition, it is foreseen that the synthesizer will be able to output diagnostic information about the tightness of various constraints, allowing users to understand design tradeoffs between required behavior and allocated resources.

Target Vehicles

To focus program efforts, program performers will apply the developed tools and techniques to a variety of vehicles. These vehicles will include:

1. Defense systems identified by the military vehicle experts;
2. "Challenge problems" created by the military vehicle experts to capture key technical problems in the defense systems in an unrestricted, unclassified version available to all performers; and
3. Various open-source vehicles.

Proposers submitting to Technical Areas 2, 3, and 4 must select and specify the open-source vehicle(s) they intend to work on. To be suitable, an open-source vehicle must satisfy the following requirements:

- Documentation and software for the vehicle must be available open-source.
- It must have at least one mechanism for external networking (e.g., WiFi, radio, etc.).
- It must have at least one onboard CPU.
- It must have or it must be possible to add a variety of payloads (e.g., navigation systems, cameras, environmental sensors, robotic arms, non-lethal weapons, etc.).
- The vehicle must have DoD applications or be analogous to a DoD system.

In addition, it is desirable for the vehicle to have the following characteristics:

- It has an open, modular architecture.
- It uses a standard communication protocol to connect system components.
- It runs on an open-source operating system.

Suitable vehicles may or may not be autonomous.

Exemplar systems satisfying these requirements were discussed at Proposer's Day; a video is available (http://www.darpa.mil/Opportunities/Solicitations/I2O_Solicitations.aspx). Pricing for

the open-source vehicle(s), as well as any required technical support activities, should be included in the proposal.

Performers in all of the Technical Areas will be expected to execute tasks cooperatively under the general oversight of the Government Team. All performers will be expected to support the integration of tools into a formal-methods workbench, performed in Technical Area 4. Performers in Technical Areas 2, 3, and 4 are expected to support the integration of high-assurance components into high-assurance open-source vehicle(s) and versions of the challenge problems, as appropriate, also performed in Technical Area 4. In addition, all performers will be expected to support the military vehicle experts in the construction of high-assurance versions of the selected defense vehicles.

Technical Area 1: Military Vehicle Experts

Each Military Vehicle Expert performer will produce a high-assurance version of a defense vehicle (i.e., one currently in use or under development by the DoD) using synthesis and formal verification tools and techniques. To facilitate this goal, Technical Area 1 performers will work closely with the performers in the other Technical Areas, including educating other performers about the technical challenges in producing high-assurance versions of the vehicle, developing unrestricted and unclassified "challenge problems" that abstract the key difficulties for use by other performers, and applying the research results from the other Technical Areas to the development of the high-assurance vehicle.

Vehicles studied in the program are required to be networked in some fashion (e.g., by radio, Ethernet, WiFi, etc.) and to have one or more control systems that interact with the physical world via one or more sensors or effectors. Preference will be given to vehicles for which the consequences of an attacker gaining control are significant. It is anticipated that producing a high-assurance version of a key portion of a complex vehicle is more persuasive as a case study than producing a high-assurance version of a complete, but simple, vehicle. Vehicles that enable the demonstration of a compelling path from the production of a single component to compositions of multiple components to a complete system are strongly preferred to vehicles that simply demonstrate the use of a single high-assurance component. It is expected that a functioning vehicle will be produced for evaluation by the Red Team performer at the beginning of Phase 1, to establish a baseline, and then at the end of each phase. The high-assurance portion of the vehicle should grow throughout the program, potentially starting from a small kernel.

A key question for the program is the extent to which the developed tools can handle system evolution, both in terms of software features and in terms of underlying hardware. As such, Military Vehicle Experts will be required to demonstrate the use of the tools on multiple versions of the identified vehicles in phase 3.

The goal of this Technical Area is to explore the applicability of program synthesis and other formal method–based techniques to the development of high-assurance, cyber-physical systems in general, using the selected vehicles as case studies. As such, short-term patches that

improve the security of the vehicles, but compromise the goals of the case study, are disallowed.

To the extent consistent with other program goals, it is strongly preferred that the identified vehicles, including platform, sensors, computing hardware, and software, are *unclassified*. Vehicles and vehicle components classified higher than collateral SECRET are highly discouraged. If it is necessary to convey classified information about an identified vehicle, proposers to Technical Area 1 may submit a classified appendix with this information, following the directions in Section IV.D.3. of this document. Pages in this appendix will count against the total page count for the proposal.

Technical Area 2: Operating Systems

This Technical Area will focus on the development of synthesis tools and other formal methods–based techniques for the production of verified operating systems and operating system components for cyber-physical systems, as previously described. This Technical Area covers all non-control system code necessary to safely and securely operate the target vehicles. Example components might include: a real-time operating system, a hypervisor or sandbox, a communications stack, a file system, a micro-kernel, an auditing system, a navigation system, etc. The program will adopt a clean-slate approach: performers are not required to verify existing code, but instead to co-develop code and the accompanying proofs.

Performers in this area are expected to support the Technical Area 1 Military Vehicle Expert performers by learning about the target defense vehicles, applying developed tools and techniques to the provided challenge problems, and consulting with Military Vehicle Experts on the application of the developed tools to the target vehicles. Performers in this area must demonstrate their tools on appropriate portions of the challenge problems and the open-source vehicle(s). The Technical Area 4 Research Integration performers will lead the effort to integrate the high-assurance components developed by researchers in Technical Areas 2 and 3 into high-assurance vehicles.

Performers in this area are expected to work with Research Integration performers to incorporate produced tools into the formal-methods workbench.

Anticipated research challenges in this area include, *but are not limited to*:

- The design of domain-specific specification languages for functional specifications, safety and security policies, hardware descriptions, and environmental descriptions.
- The creation of semi-automated program synthesis tools for the relevant domains that output diagnostic information as well as multiple program versions.
- Extensions to interactive theorem provers, automated theorem provers, and model checking tools to fit within the synthesis framework.
- Extensions to interactive theorem provers, automated theorem provers, and model checking tools to facilitate “proof engineering,” which means reducing the time required to verify a revision of a previously verified system.
- The integration of high-assurance components to produce high-assurance composites, including the integration of handwritten and synthesized code.

- The specialization of reusable components to particular applications in a way that preserves the assurance proofs.
- Verifying timing properties of synchronous and asynchronous code.

Individual proposals need not address any or all of these challenges.

It is anticipated that expertise in designing operating systems and communication protocols will be beneficial in this Technical Area.

Technical Area 3: Control Systems

This Technical Area will focus on the development of synthesis tools and other formal methods–based techniques for the production of verified control systems (excluding the underlying operating system and communication protocols, which are covered in Technical Area 2). The program will adopt a clean-slate approach: performers are not required to verify existing code, but instead to co-develop code and the accompanying proofs.

Performers in this area are expected to support Military Vehicle Expert performers by learning about the target defense vehicles, applying developed tools and techniques to the provided challenge problems, and consulting with Military Vehicle Experts on the application of the developed tools to the target vehicles. Performers in this area must demonstrate their tools on appropriate portions of the challenge problems and the open-source vehicle(s). The Technical Area 4 Research Integration performers will lead the effort to integrate the high-assurance components developed by researchers in Technical Areas 2 and 3 into high-assurance vehicles.

Performers in this area are expected to work with Research Integration performers to incorporate tools produced into the formal-methods workbench.

One of the current weaknesses of cyber-physical systems is that the constituent control systems are typically designed assuming attackers cannot communicate directly with the control systems. Recent attacks have shown this assumption is false. Consequently, designing attack-resilient control systems is one of the goals of Technical Area 3. To evaluate this effort, the Red Team will be given direct access to the control systems, in a vehicle-specific way, during the assessment exercises. As an example, if one of the target vehicles were an automobile, the Red Team might be allowed to connect directly to one of the CAN buses in the car.

Anticipated research challenges in this area include, *but are not limited to*:

- The design of domain-specific specification languages for functional specifications, safety and security policies, hardware descriptions, and environmental descriptions;
- Synthesizing attack-resilient control systems;
- Developing techniques to determine when the system is under attack, potentially by leveraging the laws of physics as a ground truth;
- Developing techniques to respond gracefully to attacks;
- Verifying and validating adaptive control systems; and
- Proving that code for monitoring safety/security properties cannot be bypassed

Individual proposals need not address any or all of these challenges.

Technical Area 4: Research Integration

This Technical Area has two sub-areas: the creation of a formal-methods workbench and the integration of high-assurance components. Performers in the Research Integration area can focus on either or both of these sub-areas.

Formal-Methods Workbench

This sub-area focuses on the integration of the tools produced by the HACMS performers in Technical Areas 2, 3, and 4 into a unified Eclipse-like workbench[2], allowing Military Vehicle Experts and other end users to access all of the tools from a single application. The research integrator will be responsible for working with other performers to design appropriate APIs, translators, and/or common representations to enable this integration.

Integration of High-Assurance Components

This sub-area focuses on the sound integration of high-assurance components to produce high-assurance composites, including composing operating system and control system code. It is anticipated that key technical challenges in this area include understanding how to architect components so their composition produces the desired safety and security properties of the composite and developing tools and techniques for coping with different notions of time.

Performers in this area are expected to support Military Vehicle Expert performers by learning about the target defense vehicles, applying developed tools and techniques to the provided challenge problems, and consulting with Military Vehicle Experts on the application of the developed tools to the target vehicles. Performers in this area will lead the effort to integrate the high-assurance components developed by researchers in Technical Areas 2, 3, and 4 into high-assurance versions of the challenge problems and the open-source vehicle(s).

Technical Area 5 Red Team

This Technical Area is focused on assessing the security of the targeted vehicles, including the defense vehicles provided by the Military Vehicle Experts, the challenge problems, and the open-source vehicle(s). To that end, the Red Team will conduct static and dynamic baseline assessments of all target systems before any modifications are made. At the conclusion of each phase, the Red Team will conduct static and dynamic assessments of the vehicles produced during that phase.

An attack will be considered successful if it allows the Red Team to inject arbitrary code, force sensors to deliver bogus values, or prevent legitimate users from achieving mission objectives. The program will primarily consider attackers that only have networked access to the vehicle, not physical access. However, to evaluate the resilience of the control systems if the periphery security mechanisms fail, the Red Team will separately be allowed to communicate directly with the control systems, e.g., through direct access to an internal bus.

[2] Information on Eclipse is available from the Eclipse web site: www.eclipse.org.

Because the point of the Red-Team exercise is to evaluate the synthesis and formal-methods tools, the attackers will restrict their focus to those parts of the system that have been built by HACMS performers. They will be allowed full access to the developed tools and the resulting software, but they cannot make modifications to the tools.

Performers in this area are responsible for working with other performers to understand potential security flaws throughout the program.

Schedule and Budgeting Information

The schedule listed herein contains notional estimates. Proposers should submit a detailed schedule that is consistent with the maturity of their approaches and the risk reduction required for their concepts. These schedules will be synchronized across performers, as required, and monitored/revised as necessary throughout the HACMS program's period of performance. For budgeting purposes, please use July 1, 2012 as an estimated start date.

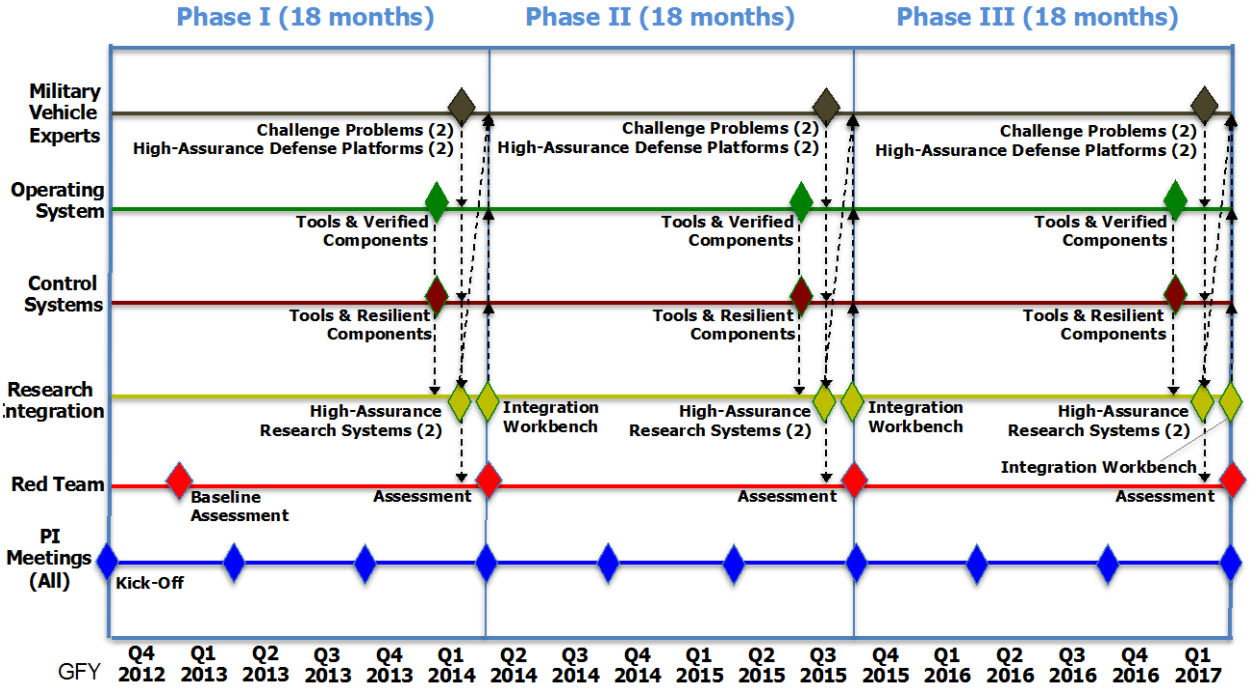

Figure 2. Program Schedule

The Government will specify the locations for program reviews, Principal Investigator (PI) meetings, and other events. In general, for budgeting travel, assume that program reviews will be held either in Washington, D.C., or at the performer's location once a year. It is currently anticipated that the program kickoff meeting will occur in early July 2012, after contract signing. *It is strongly encouraged that all subcontracts are signed within one month of award of the prime contract.*

PI meetings will be held approximately every 6 months, with the locations split between the East and West Coasts of the United States. The goals of the PI meetings will be to: (a) review system architecture and integration progress; (b) review accomplishments of each performer;

(c) demonstrate prototype and other phase accomplishments; and (d) review plans for the next phase. The PI meetings will have registration fees that are currently estimated to be $350 per person, in addition to travel and lodging costs.

In addition to site visits, monthly teleconference meetings will be held with each PI to enhance communications with the Government team. Should important issues arise between program reviews, the Government team will be available to support informal interim technical interchange meetings. It is anticipated that the vehicle teams and other working groups will be formed and interact as needed.

Milestones

By month 3 of Phase I, the Military Vehicle Experts will give the Red Team access to functioning original versions of the identified defense vehicles so the Red Team can assess the baseline security of these vehicles. The Red Team will produce written security assessments of these vehicles by month 6 of Phase I. In addition, the Red Team will produce a baseline written security assessments of the open-source vehicle(s) by month 3 of Phase I.

By month 17 of each phase, performers in Technical Areas 1, 2, 3, and 4 will give the Red Team access to functioning, high-assurance versions of the target vehicles, including the defense vehicles identified by the Military Vehicle Experts, the open-source vehicle(s), and challenge problems as appropriate. The Red Team will produce security assessments by the end of month 18 of each phase.

Deliverables

All performers shall be required to provide the following deliverables:

- Source code, other necessary data, and accompanying documentation for all software developed under this program.
- Slide Presentations. Annotated slide presentations shall be submitted within one month after the program kickoff meeting and after each program event (program reviews, PI meetings, and technical interchange meetings).
- Monthly Progress Reports. A monthly progress report describing technical progress made, resources expended, major risks, planned activities, trip summaries, changes to key personnel, and any potential issues and problem areas requiring the attention of the Government team shall be provided within 10 days after the end of each month.
- A Technical and Management Work Plan with a project schedule including milestones, updated as required.
- Final Report after each program phase. The final report shall concisely summarize the effort conducted.

In addition to the above deliverables, performers in Technical Areas 2-5 will be required to deliver the following:

Technical Area 2 performers will provide executable versions of the tools they develop, documentation and source code for those tools, and high-assurance operating system components, including the source specifications and all generated artifacts.

Technical Area 3 performers will provide executable versions of the tools they develop, documentation and source code for those tools, and high-assurance control system components, including the source specifications and all generated artifacts.

Technical Area 4 performers will deliver an executable, formal-methods workbench, its source code, and accompanying documentation. Technical Area 4 performers will also deliver functioning, high-assurance versions of the open-source vehicle(s) and challenge problems, as appropriate.

Technical Area 5 performers will deliver reports assessing the quality and security of the target vehicles, including the defense vehicles identified by the Military Vehicle Experts, the open-source vehicle(s), and challenge problems as appropriate.

Intellectual Property

All verification and synthesis tools that will be developed or delivered under this program are desired to be made freely and publicly redistributable. To the extent permitted, it is desired that the generated operating system and control system components will also be made open source. See Section VI.B.2. of this document for more details on intellectual property.

II. AWARD INFORMATION

Multiple awards are anticipated. The level of funding for individual awards made under this BAA has not been predetermined and will depend on the quality of the proposals received and the availability of funds. Awards will be made to proposers whose proposals are determined to be the most advantageous and provide the best value to the Government, all factors considered, including the potential contributions of the proposed work, overall funding strategy, and availability of funding for the effort. See Section V.B. for further information.

Proposals selected for award negotiation may result in a procurement contract, cooperative agreement, or other transaction depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors. In all cases, the contracting officer shall have sole discretion to select award instrument type and to negotiate all instrument provisions with selectees.

Some projects funded under this BAA are expected to be *fundamental research*, basic and applied research in science and engineering, the results of which are ordinarily published and shared broadly within the scientific community. This is distinguished from proprietary research and industrial development, design, production, and product utilization, the results of which are ordinarily restricted for proprietary or national security reasons. Under this solicitation, DARPA is seeking proposals that meet the BAA criteria for submissions, whether or not they are fundamental research. Section VI.B.5 has information on publishing restrictions.

The Government reserves the right to:

- Select for negotiation all, some, one, or none of the proposals received in response to this solicitation.
- Make awards without discussions with proposers.
- Conduct discussions if it is later determined to be necessary.
- Segregate portions of resulting awards into pre-priced options.
- Accept proposals in their entirety or to select only portions of proposals for award.
- Fund proposals in phases with options for continued work at the end of one or more phases.
- Request additional documentation once the award instrument has been determined; such information may include but is not limited to representations and certifications.
- Remove proposers from award consideration should the parties fail to reach agreement on award terms within a reasonable time or the proposer fails to provide requested additional information in a timely manner.

III. ELIGIBILITY

A. Applicants

All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA.

1. **Historically Black Colleges and Universities, Small Businesses, Small Disadvantaged Businesses and Minority Institutions:** Historically black colleges and universities (HBCUs), small businesses, small disadvantaged businesses and minority institutions (MIs) are encouraged to submit proposals and team with others to submit proposals; however, no portion of this announcement will be set aside for these organizations due to the impracticality of reserving discrete or severable areas of this research for exclusive competition among these entities.

2. **Federally Funded Research and Development Centers (FFRDCs) and Government Entities:** Federally funded research and development centers (FFRDCs) and Government entities (e.g., Government/national laboratories and military educational institutions) are subject to applicable direct competition limitations and cannot propose to this BAA in any capacity unless the following conditions are met.

   - FFRDCs must clearly demonstrate that the proposed work is not otherwise available from the private sector and must provide a letter on letterhead from their sponsoring organization citing the specific authority establishing eligibility to propose to Government solicitations and compete with industry and compliance with the associated FFRDC sponsor agreement and terms and conditions. This information is required for FFRDCs proposing as either prime contractors or subcontractors.

   - Government entities must clearly demonstrate that the proposed work is not otherwise available from the private sector and provide written documentation citing the specific statutory authority (and contractual authority, if relevant) establishing the ability to propose to Government solicitations.

   At the present time, DARPA does not consider 15 U.S.C. 3710a to be sufficient legal authority to show eligibility. While 10 U.S.C. 2539b may be the appropriate statutory starting point for some entities, specific supporting regulatory guidance, together with evidence of agency approval, will still be required to fully establish eligibility.

   DARPA will consider eligibility submissions on a case-by-case basis; however, the burden to prove eligibility for all team members rests solely with the proposer.

3. **Foreign Participation:** Non-U.S. organizations and/or individuals may participate to the extent that such participants comply with any necessary nondisclosure agreements, security regulations, export control laws, and other governing statutes applicable under the circumstances.

B. Procurement Integrity

Active Federal employees are prohibited from participating in particular matters involving conflicting financial, employment, and representational interests (18 U.S.C. §§ 203, 205, and 208). Prior to the start of proposal evaluation, the Government will assess potential conflicts of interest and will promptly notify the proposer if any appear to exist. The Government assessment does not affect, offset, or mitigate the proposer's responsibility to give full notice and planned mitigation for all potential organizational conflicts, as discussed below.

Without the prior approval or a waiver from the DARPA Director, a contractor cannot simultaneously be a scientific, engineering, and technical assistance (SETA) contractor and a performer. (See Federal Acquisition Regulation (FAR) 9.503 at https://www.acquisition.gov/FAR/.) As part of the proposal submission, proposers, proposed subcontractors and consultants must affirm whether they (individuals and organizations) are providing SETA or similar support to any DARPA technical office(s) through an active contract or subcontract. Affirmations must state which office(s) the proposer and/or proposed subcontractor/consultant supports and must provide prime contract numbers. All facts relevant to the existence or potential existence of organizational conflicts of interest (FAR 9.5) must be disclosed. The disclosure shall include a description of the action the proposer has taken or proposes to take to avoid, neutralize, or mitigate such conflict. Proposals that fail to fully disclose potential conflicts of interest and/or do not have plans to mitigate this conflict may be rejected without technical evaluation and withdrawn from further consideration for award.

If a prospective proposer believes a conflict of interest exists or may exist (whether organizational or otherwise) or has a question as to what constitutes a conflict, a summary of the potential conflict should be sent to HACMS@darpa.mil before preparing a proposal and mitigation plan. If, in the sole opinion of the Government after full consideration of the circumstances, any conflict situation cannot be effectively mitigated, a proposal may be rejected without technical evaluation and withdrawn from further consideration for award under this BAA.

C. Cost Sharing/Matching

Cost sharing/matching is not required unless a statutory condition applies such as the conditions of 10 U.S.C. 2371 as they apply to other transactions (see Section IV.B.2.e).

D. Other Eligibility Requirements

1. **Submission of Proposals to Multiple Technical Areas:** A proposer should submit no more than one proposal as a prime contractor. Such a proposal may cover one to five Technical Areas. However, proposers selected for Technical Area 5 (Red Team) cannot be selected for any portion of the other four Technical Areas, whether as a prime, subcontractor, or in any other capacity from an organizational to individual level. This restriction is to avoid organizational conflict of interest situations between the Technical Areas and to ensure objective test and evaluation results. If a proposal is submitted for more than one

Technical Area, the decision as to which Technical Area(s), if any, to consider for award is at the discretion of the Government.

2. **Documentation of your Ability to Support Classified Development:** Proposers submitting a proposal for Technical Areas 1, 4, and 5 must include what level of classified support (e.g., Secret, Top Secret, SCI) they can provide, their CAGE code, and security point(s) of contact in their proposals (see Section IV.C.2).

IV. APPLICATION

A. Announcement

This announcement contains all information required to respond to this solicitation and constitutes the total BAA. No additional forms, kits, or other materials are needed. No request for proposal (RFP) or additional solicitation regarding this opportunity will be issued, nor is additional information available except as provided at the FedBizOpps website (http://www.fbo.gov) or referenced in this document.

B. Proposals

Proposals consist of Volume 1: Technical and Management Proposal (including Appendix A and optional Appendix B) and Volume 2: Cost Proposal.

All pages shall be formatted for printing on 8-1/2 by 11-inch paper with a font size not smaller than 12 point. Font sizes of 8 or 10 point may be used for figures, tables, and charts.

Document files must be in Portable Document Format (.pdf, ISO 32000-1), OpenDocument (.odx, ISO/IEC 26300:2006), .doc, .docx, .xls, .or .xlsx formats.

Submissions must be written in English.

Proposals not meeting the format prescribed herein may not be reviewed.

1. Volume I: Technical and Management Proposal

If a proposer submits a proposal for one Technical Area, the maximum count for Volume 1 is 30 pages, including all figures, tables and charts but not including the cover sheet, table of contents or appendices. For each additional Technical Area being proposed, the maximum count for Volume 1 is increased by 10 pages, including all figures, tables and charts but not including the cover sheet, table of contents or appendices. For example, if a proposer submits a proposal for two Technical Areas, the maximum count is 40 pages. A submission letter is optional and is not included in the page count. Appendix A does not count against the page limit and is mandatory. Appendix B does not count against the page limit and is optional. Additional information not explicitly called for here must not be submitted with the proposal, but may be included as links in the bibliography in Appendix B. Such materials will be considered for the reviewers' convenience only and not evaluated as part of the proposal.

Volume I must include the following components:

a. Cover Sheet:

- BAA number (DARPA-BAA-12-21)
- Technical Area(s) being proposed
- Lead organization (prime contractor) name

- Type of business, selected from among the following categories: “LARGE BUSINESS”, “SMALL DISADVANTAGED BUSINESS,” “OTHER SMALL BUSINESS,” “HBCU,” “MI,” “OTHER EDUCATIONAL,” OR “OTHER NONPROFIT”
- Contractor’s reference number (if any)
- Other team members (if applicable) and type of business for each
- Proposal title
- Technical point of contact including name, mailing address, telephone, email, and fax
- Administrative point of contact including name, mailing address, telephone, email, and fax
- Award instrument requested: cost-plus-fixed-free (CPFF), cost-contract—no fee, cost sharing contract – no fee, or other type of procurement contract (specify), cooperative agreement or other transaction agreement. Information on award instruments can be found at http://www.darpa.mil/Opportunities/Contract_Management/Contract_Management.aspx.
- Place(s) and period(s) of performance
- Subcontractor information
- Proposal validity period (minimum 120 days)
- DUNS number (http://www.dnb.com/US/duns_update)
- Taxpayer identification number (http://www.irs.gov/businesses/small/international/article/0,,id=96696,00.html)
- CAGE code (http://www.dlis.dla.mil/CAGESearch/cage_faq.asp)
- Label: “PROPOSAL: VOLUME I”

b. Table of Contents

c. Executive Summary: Provide a synopsis of the proposed project, including answers to the following questions:

- What are you trying to do?
- How is it done today and what are the limitations?
- Who will care and what will the impact be if you are successful?
- How much will it cost, and how long will it take?

The summary should include a description of the key technical challenges, a concise review of the technologies proposed to overcome these challenges and achieve the effort’s goal, and a clear statement of the novelty and uniqueness of the proposed idea.

d. Goals and Impact: Describe clearly what the team is trying to achieve and the difference it will make (qualitatively and quantitatively) if successful. Describe the innovative and clean-slate aspects of the project in the context of existing capabilities and approaches, clearly delineating the uniqueness and benefits of this project in the context of the state of the art, alternative approaches, and other projects from the

past and present. Describe how the proposed project is revolutionary and how it significantly rises above the current state of the art.

Describe the principal deliverables associated with the proposed project and any plans to commercialize the technology, transition it to a customer, or further the work. Discuss the mitigation of any issues related to sustainment of the technology over its entire lifecycle, assuming the technology transition plan is successful.

e. Technical Plan: Outline and address technical challenges inherent in the approach and possible solutions for overcoming potential problems. Provide appropriate measurable milestones (quantitative if possible) at intermediate stages of the effort to demonstrate progress, and a plan for achieving the milestones. Demonstrate a deep understanding of the technical challenges and present a credible (even if risky) plan to achieve the effort's goal. Discuss mitigation of technical risk.

f. Management Plan: Provide a summary of expertise of the team, including any subcontractors, and key personnel who will be doing the work. Resumes count against the proposal page count. Identify a principal investigator for the project. Provide a clear description of the team's organization including an organization chart that includes, as applicable, the relationship of team members; unique capabilities of team members; task responsibilities of team members; teaming strategy among the team members; and key personnel with the amount of effort to be expended by each person during each year. Include a detailed plan for coordination including explicit guidelines for interaction among collaborators/subcontractors of the proposed effort. Include risk management approaches. Describe any formal teaming agreements that are required to execute this effort. Describe how the team will interact with performers in other Technical Areas.

g. Capabilities: Describe organizational experience in this area, existing intellectual property, specialized facilities, and any Government-furnished materials or data. Provide a discussion of any work in closely related research areas and previous accomplishments.

h. Statement of Work (SOW): The SOW should provide a detailed task breakdown, citing specific tasks and their connection to the interim milestones and effort metrics, as applicable. Each phase of the effort should be separately defined.

For each task/subtask, provide:

- General description of the objective.
- Detailed description of the approach to be taken to accomplish each defined task/activity.
- Identification of the primary organization responsible for task execution (prime contractor, subcontractor, team member, by name).
- Measurable milestone; i.e., a deliverable, demonstration, or other event that marks completion.

- Definition of all deliverables (e.g., reporting, data, reports, and software) to be provided to the Government in support of the proposed research tasks/activities.
- Identify any tasks/subtasks (by the prime or subcontractor) that will be accomplished on campus at a university.

The SOW must not include proprietary information.

i. Schedule and Milestones: Provide a detailed schedule showing tasks (task name, duration, work breakdown structure element as applicable, performing organization), milestones, and the interrelationships among tasks. The task structure must be consistent with that in the SOW. Measurable milestones should be clearly articulated and defined in time relative to start of effort. Milestone dates should be consistent with the schedule presented in this BAA.

j. Cost Summary: Provide the cost summary as described in Section IV.C.2.b.

k. Appendix A: This section is mandatory and must include all the following components.

- **Team Member Identification:** Provide a list of all team members (prime, subcontractors, consultants). Identify specifically whether any are a non-US organization or individual, FFRDC and/or Government entity as applicable.

- **Government or FFRDC Team Member:** Provide documentation (per Section III.A.2) citing the specific authority that establishes the applicable team member as eligible to propose to Government solicitations to include: (1) statutory authority; (2) contractual authority; (3) supporting regulatory guidance; and (4) evidence of agency approval for applicable team member participation. In addition, provide a statement that demonstrates the work being provided by the Government or Government-funded entity team member is not otherwise available from the private sector.

  State "NONE" if none of the team member organizations (prime or subcontractor) belong to a Government entity or FFRDC.

- **Organizational Conflict of Interest Affirmations and Disclosure:** State "NONE" if neither the proposer nor any proposed subcontractor is currently providing SETA support as described in Section III.B.

  Otherwise, provide the following information for the proposer and each proposed subcontractor, as applicable:

Prime Contract Number	DARPA Office supported	A description of the action the proposer has taken or proposes to take to avoid, neutralize, or mitigate the conflict

- **Intellectual Property:** Provide (per Section VI.B.2) a list of all technical data or computer software that will be furnished to the Government with other than unlimited rights. Include all proprietary claims to results, prototypes, deliverables or systems supporting and/or necessary for the use of the research, results, prototypes and/or deliverables. Provide documentation proving ownership or possession of appropriate licensing rights to all patented inventions (or inventions for which a patent application has been filed) to be used for the proposed project. The Government will assume unlimited rights to all intellectual property not explicitly identified as restricted in the proposal. For each item to be furnished with other than unlimited rights, provide a rationale or mitigation strategy to achieve the Government's objective of providing program results to the public with unlimited rights to the greatest extent possible.

  State "NONE" if no restrictions are intended and patents are not applicable.

- **Human Use:** Provide evidence of or a plan for review by an institutional review board (IRB) for all proposed research that will involve human subjects in the first phase of the project. For further information on this subject, see Section VI.B.3.

  State "NONE" if human use is not a factor in a proposal.

- **Animal Use:** For submissions containing animal use, proposals must briefly describe plans for Institutional Animal Care and Use Committee (IACUC) review and approval. For further information on this subject, see Section VI.B.4.

  State "NONE" If animal use is not a factor in a proposal.

- **Subcontractor Plan:** Prepare a subcontracting plan in accordance with FAR 19.702(a)(1) and (2). Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. § 637(d)), it is Government policy to enable small business and small disadvantaged business concerns to be considered fairly as subcontractors to contractors performing work or rendering services as prime contractors or subcontractors under Government contracts, and to ensure that prime contractors and subcontractors carry out this policy. The plan format is outlined in FAR 19.704.

l. Appendix B: Include, if desired, a brief bibliography with links to relevant papers, reports, videos, or resumes. Do not include technical papers in the submission. This

section is optional, and the linked materials will not be evaluated as part of the review.

2. Volume II: Cost Proposal

This section is mandatory and must include all the listed components. No page limit is specified for this volume. A separate costing, including all the components except (a), must be submitted for each Technical Area being proposed. Assume a start date of 1 July 2012.

a. Cover Sheet: Include the same information as the cover sheet for Volume I with the label "PROPOSAL: VOLUME II."

b. Cost Summary: Provide a single-page summary with cost totals for labor, materials, other direct charges (ODCs), general and administrative (G&A), and the proposed fee (if any) for the effort by program phase. Include costs for each task in each program phase and program year of the effort by prime and major subcontractors, total cost and company cost share, if applicable. Include any requests for Government-furnished equipment or information with cost estimates (if applicable).

c. Detailed Cost Information: Provide detailed cost information for direct labor (including labor categories), materials, ODCs and indirect costs by month for each task of the project. Information provided for subcontractors must be at the same level of detail as that provided for prime contractors. Both labor rates and hours should be detailed. A separate breakdown should be done for each proposed phase.

Summarize task-level cost information to give total expenditures on labor, materials, and ODCs by month for prime and subcontractors. Identify cost sharing (if any). Itemize purchases of information technology (as defined in FAR 2.101). Provide totals for all cost categories.

The cost proposal should include a spreadsheet file (.xls, .or equivalent format) that provides formula traceability among all components of the cost proposal. Costs must be traceable between prime and subcontractor as well as between the cost proposal and the statement of work. The spreadsheet file should be included as a separate component of the zipped submission package.

For information technology and equipment purchases that are equal to or greater than $50,000 for a single item, a letter should be included justifying the purchase using resources other than from internal funding.

Supporting cost and pricing information shall include a description of the method used to estimate costs and supporting documentation. "Cost or pricing data" as defined in FAR Subpart 15.4 shall be required if the proposer is seeking a procurement contract award of $700,000 or greater unless the proposer requests an exception from the requirement to submit this information. Cost or pricing data is not required if the

proposer proposes an award instrument other than a procurement contract (e.g., cooperative agreement or other transaction).

Pre-award costs are not reimbursable for awards under this BAA.

See Section III.C for information on cost sharing/matching.

See the cost proposal checklist provided in Section VIII.C for further information.

d. Subcontractors: The proposer is responsible for the compilation and submission of all subcontractor cost proposals. Proposal submissions will not be considered complete until the Government has received all subcontractor cost proposals.

Proprietary subcontractor cost proposals may be included as part of Volume II or submitted separately to HACMS@darpa.mil (i.e., not uploaded to the submission site). Email messages should include "Subcontractor Cost Proposal" in the subject line and identify the principal investigator and prime proposer organization in the message.

Subcontractor cost proposals should include interdivisional work transfer agreements or similar arrangements.

e. Other Transactions: If the proposer requests award of an 845 Other Transactions (OT) as a nontraditional defense contractor, as defined in the OSD guide "Other Transactions (OT) Guide For Prototype Projects" dated January 2001 (as amended) (http://www.acq.osd.mil/dpap/Docs/otguide.doc), information must be included in the cost proposal to support the claim. If the proposer requests award of an 845 OT agreement without the required one-third cost share, information must be included in the cost proposal supporting the claim that there is at least one nontraditional Defense contractor participating to a significant extent in the proposed prototype project.

Proposers requesting an 845 OT for Prototypes agreement must include a detailed list of milestones including: milestone description, completion criteria, due date, and payment/funding schedule (to include, if cost share is proposed, contractor and Government share amounts). Milestones should relate directly to accomplishment of technical metrics as defined in the BAA and/or the proposal. Agreement type, fixed price or expenditure based, will be subject to negotiation with DARPA; however, the use of fixed price milestones with a payment/funding schedule is preferred. Proprietary information must not be included as part of the milestones.

For information on 845 OTs, refer to http://www.darpa.mil/Opportunities/Contract_Management/Other_Transactions_and_Technology_Investment_Agreements.aspx.

C. Proprietary and Classified Information

1. **Proprietary Information:** DARPA policy is to treat all proposals as source selection information (see FAR 2.101 and 3.104) and to disclose the contents only for the purpose of evaluation.

   Proposers are responsible for identifying proprietary information to DARPA. Proposals containing proprietary information must have the cover page and each page containing such information clearly marked. Proprietary information must not be included in the schedule, milestones, or SOW.

   During the evaluation process, proposals may be handled by one or more support contractors for administrative purposes and/or to assist with technical evaluation. All DARPA support contractors performing this role are expressly prohibited from performing DARPA-sponsored technical research and are bound by appropriate nondisclosure agreements.

2. **Classified Information:** Proposers submitting classified proposals/appendices or requiring access to classified information during the lifecycle of the effort shall ensure all industrial, personnel, and information system processing security requirements (e.g., facility clearance (FCL), personnel security clearance (PCL), certification and accreditation (C&A)) are in place and at the appropriate level, and any foreign ownership control and influence (FOCI) issues are mitigated prior to submission or access. Proposers must have existing, approved capabilities (personnel and facilities) prior to award to perform research and development at the classification level proposed. Additional information on these subjects is at http://www.dss.mil.

   If a proposal is submitted as "Classified National Security Information" as defined by Executive Order 13526, the information must be marked and protected as though classified at the appropriate classification level and submitted to DARPA for a final classification determination.

   Classified submissions must indicate the classification level of not only the proposal materials, but also the anticipated classification level of the award document.

   After an incoming proposal is reviewed and a determination has been made that the award instrument may result in access to classified information, a DD Form 254, "DoD Contract Security Classification Specification," will be issued and attached as part of the award. A DD Form 254 will not be provided at the time of submission. The DD Form 254 template is available at http://www.dtic.mil/dtic/pdf/formsNguides/dd0254.pdf. Proposers on Technical Area 1 may propose a classification level appropriate to the vehicle and defense environment being proposed. However, lower levels (including unclassified) are more desirable in order to facilitate technology transition from the research proposers selected in Technical Areas 2, 3, and 4. Bidders on Technical Area 5 will be required to accept an award at the classification level of the highest level of any

proposer selected in Technical Area 1, in order to facilitate the evaluation of all of the selected defense vehicles.

Proposers choosing to submit a classified proposal from other classified sources must first receive permission from the respective original classification authority (OCA) to use this information in replying to this BAA. Applicable classification guide(s) must be submitted to ensure the proposal is protected at the appropriate classification level.

Classified submissions shall be appropriately and conspicuously marked with the proposed classification level and declassification date. Submissions requiring DARPA to make a final classification determination shall be marked as follows:

> CLASSIFICATION DETERMINATION PENDING. Protect as though classified (insert the recommended classification level: Confidential, Secret, or Top Secret)

Classified proposals will not be returned. The original of each classified proposal received will be retained at DARPA, and all other copies destroyed. A destruction certificate will be provided if a formal request is received by DARPA within 5 days of notification of non-selection.

D. Submission Instructions

1. **Due Dates:** The proposal package--full proposal (Volume I and II) and, as applicable, the encryption password, proprietary subcontractor cost proposals, classified appendices to unclassified proposals--must be submitted per the instructions outlined in this document and received by DARPA by the initial closing in order to be considered during the initial evaluation phase. Proposers are warned that submission deadlines, as outlined herein, are strictly enforced. While this solicitation will remain open until the final closing date/BAA expiration, proposers are warned that the likelihood of funding is greatly reduced for proposals submitted after the initial closing date.

   DARPA will acknowledge receipt of complete submissions via email and assign control numbers that should be used in all further correspondence regarding proposals. Note: These acknowledgements will not be sent until after the proposal due date.

   Failure to comply with the submission procedures may result in the submission not being evaluated.

2. **Unclassified Submission:** Proposers must submit their entire proposal via the same communication method; applications cannot be submitted in part via one method and in part via another method nor should duplicate submissions be sent via multiple methods.

a. Procurement Contract or Other Transaction Agreement Proposers: Unclassified proposals sent in response to DARPA-BAA-12-21 should be submitted electronically through the DARPA BAA Submission System (https://www.tfims.darpa.mil/baa/). Email submissions will not be accepted.

Because the DARPA BAA Submission System requires registration and certificate installation, adequate time before deadlines should be allowed to complete this process. Information regarding account request, proposal upload, and other functions is available at https://www.tfims.darpa.mil/baa/.

Proposals submitted through the DARPA BAA submission system must be compressed and submitted as a single zip file (http://en.wikipedia.org/wiki/ZIP_(file_format)). Only one file will be accepted per submission, and submissions not zipped will be rejected. All proposals submitted through the DARPA BAA Submission System (not including Grants.gov) must be encrypted using Winzip or PKZip with 256-bit AES encryption. Passwords should be emailed to HACMS@darpa.mil at the time of proposal submission.

b. Cooperative Agreement Proposers: Proposers applying for cooperative agreements may submit through one of the following methods: (1) electronic upload per the instructions at http://www.grants.gov/applicants/apply_for_grants.jsp or (2) mailed directly to DARPA.

Once Grants.gov has received an uploaded proposal submission, Grants.gov will send two email messages to advise proposers as to whether or not their proposals have been validated or rejected by the system; it may take up to two days to receive these emails. The first email will confirm receipt of the proposal by the Grants.gov system; this email only confirms receipt, not acceptance, of the proposal. The second will indicate that the proposal has been successfully validated by the system prior to transmission to DARPA or has been rejected due to errors. If the proposal is validated, then the proposer has successfully submitted their proposal. If the proposal is rejected, the proposer will have to resubmit their proposal. Once the proposal is retrieved by DARPA, the proposer will receive a third email from Grants.gov. Once the proposal is accepted by DARPA, the proposer will receive an email from DARPA acknowledging receipt and providing a control number.

To avoid missing deadlines, proposers should submit their proposals in advance of the final proposal due date with sufficient time to receive confirmations and correct any errors in the submission process through Grants.gov.

Technical support for Grants.gov submissions may be reached at 1-800-518-4726 and support@grants.gov.

3. **Classified Submission:** DARPA anticipates that submissions under this BAA will be unclassified; however, classified submissions will be accepted. Classified proposals must be appropriately marked and must not be submitted electronically by any means, including the electronic upload system or Grants.gov, as described above.

   Classified materials must be submitted in accordance with the following guidelines:

- *Confidential and Secret Collateral Information*: Use classification and marking guidance provided by previously issued security classification guides, DoD 5200.1-R "Information Security Regulation" and DoD 5220.22-M "National Industrial Security Program Operating Manual," when marking and transmitting information previously classified by another OCA. All classified information will be enclosed in opaque inner and outer covers and double wrapped. The inner envelope shall be sealed and plainly marked with the assigned classification and addresses of both sender and addressee. Classified information at the Confidential or Secret level may be submitted via one of the following methods:

  - Hand carried by an appropriately cleared and authorized courier to DARPA. Prior to traveling, the courier shall contact the DARPA Classified Document Registry (CDR) at 703-526-4052 to coordinate arrival and delivery.

  - Mailed via appropriate U.S. Postal Service methods (e.g., Registered Mail or Express Mail). All classified information will be enclosed in opaque inner and outer covers and double wrapped. The inner envelope shall be sealed and plainly marked with the assigned classification and addresses of both sender and addressee.

  The inner envelope shall be addressed to:

  Defense Advanced Research Projects Agency
  ATTN: I2O
  Reference: DARPA-BAA-12-21
  3701 North Fairfax Drive
  Arlington, VA 22203-1714

  Any submissions mailed beginning April 2, 2012 shall be addressed to:

  Defense Advanced Research Projects Agency
  ATTN: I2O
  Reference: DARPA-BAA-12-21
  675 North Randolph Street
  Arlington, VA 22203-2114

  The outer envelope shall be sealed without identification as to the classification of its contents and addressed to:

Defense Advanced Research Projects Agency
Security & Intelligence Directorate, Attn: CDR
3701 North Fairfax Drive
Arlington, VA 22203-1714

Any submissions mailed beginning April 2, 2012 shall be addressed to:

Defense Advanced Research Projects Agency
Security & Intelligence Directorate, Attn: CDR
675 North Randolph Street
Arlington, VA 22203-2114

- *Top Secret Information*: Top Secret information must be hand carried by an appropriately cleared and authorized courier to DARPA. Prior to traveling, the courier must contact DARPA CDR at 703-526-4052 for instructions.

- *Special Access Program (SAP) Information*: SAP information must be transmitted via approved methods. Prior to submission, the courier must contact DARPA SAPCO at 703-526-4052 for instructions.

- *Sensitive Compartmented Information (SCI)*: SCI must be transmitted via approved methods. Prior to submission, contact DARPA CDR at 703-526-4052 for instructions.

E. Intergovernmental Review

Not applicable.

F. Funding Restrictions

Not applicable.

V. EVALUATION

A. Evaluation Criteria

Evaluation of proposals will be accomplished through a scientific/technical review of each proposal using the following criteria listed in descending order of importance: (a) Overall Scientific and Technical Merit; (b) Potential Contribution and Relevance to the DARPA Mission; (c) Management Plan; (d) Plans and Capability to Accomplish Technology Transition; and (e) Cost Realism.

- *Overall Scientific and Technical Merit:* The proposed technical approach is feasible, achievable, complete and supported by a proposed technical team that has the expertise and experience to accomplish the proposed tasks. Task descriptions and associated technical elements are complete and in a logical sequence, with all proposed deliverables clearly defined such that a viable attempt to achieve effort goals is likely as a result of award. The proposal identifies major technical risks, and mitigation efforts are clearly well defined and feasible.

- *Potential Contribution and Relevance to the DARPA Mission*: The potential contributions of the proposed effort with relevance to the national technology base will be evaluated. Specifically, DARPA's mission is to maintain the technological superiority of the U.S. military and prevent technological surprise from harming our national security by sponsoring revolutionary, high-payoff research that bridges the gap between fundamental discoveries and their application.

- *Management Plan:* The strength of the performer team and the appropriateness of the organizational makeup and structure to address the technical execution of the program. Proposer's ability to realistically estimate the time required to accomplish the goals and objectives of the program and to substantiate these estimates will be evaluated. The identification of areas of schedule risk and the approach to mitigate the risks will be assessed.

- *Plans and Capability to Accomplish Technology Transition:* The proposer will be evaluated on their capability to transition the technology to the research, industrial, and/or operational military communities in such a way as to enhance U.S. defense and national security. In addition, the evaluation will take into consideration the extent to which the proposed intellectual property (IP) rights will potentially impact the Government's ability to transition the technology.

- *Cost Realism:* The objective of this criterion is to establish that the proposed costs are realistic for the technical and management approach offered and to determine the proposer's practical understanding of the effort. The proposal will be reviewed to determine if the costs proposed are based on realistic assumptions, reflect a sufficient understanding of the technical goals and objectives of the BAA, and are consistent with the proposer's technical approach (to include the proposed SOW). At a minimum, this review will include, at the prime and subcontract level, the type and number of labor

hours proposed per task, the types and quantity of materials, equipment and fabrication costs, travel and other various elements proposed. For efforts with a likelihood of commercial application, appropriate direct cost sharing may be a positive factor in the evaluation. The evaluation criterion recognizes that undue emphasis on cost may motivate proposers to offer low-risk ideas with minimum uncertainty and to staff the effort with junior personnel to be in a more competitive posture. Cost strategies such as these are discouraged.

B. Review and Selection Process

DARPA policy is to ensure impartial, equitable, comprehensive proposal evaluations and to select sources whose offers meet the DARPA technical, policy, and programmatic goals.

In order to provide the desired evaluation, qualified Government personnel will conduct reviews and (if necessary) convene panels of experts in the appropriate areas. Subject to the restrictions set forth in FAR 37.203(d), input on technical aspects of the proposals may be solicited by DARPA from non-Government consultants/experts who are strictly bound by appropriate nondisclosure requirements.

The review process identifies proposals that meet the established criteria and are, therefore, selectable for funding awards by the Government. Selections under this BAA will be made to proposers on the basis of the evaluation criteria listed in Section V.A. Proposals that are determined to be selectable will not necessarily receive awards. Selections may be made at any time during the period of solicitation.

Proposals are evaluated individually, not rated competitively against other proposals because they are not submitted in accordance with a common work statement. For purposes of evaluation, a proposal is defined to be the document and supporting materials (except Appendix B) as described in Section IV.

Failure to comply with the submission procedures may result in the submission not being evaluated. No proposals, classified or unclassified, will be returned. After proposals have been evaluated and selections made, the original of each proposal will be retained at DARPA. Hard copies will be destroyed.

VI. AWARD ADMINISTRATION

A. Selection Notices

After proposal evaluation is complete, proposers will be notified whether their proposals are selectable as determined by the review process. The Government may initiate contract negotiations if the proposal has been selected for immediate funding. Notification will be sent by email to the technical and administrative POCs identified on the proposal coversheet.

B. Administrative and National Policy Requirements

1. **Meeting and Travel Requirements:** Performers should anticipate periodic site visits at the program manager's discretion. Performers will also be required to attend PI meetings every six months, including some held jointly with other DARPA programs. Other travel may be required to integrate tools into the formal-methods workbench being developed by Technical Area 4 performer(s) and to use this workbench to create the targeted high-assurance vehicles.

2. **Intellectual Property:** Since the program's explicit goal is to provide its products (other than the defense vehicles) to the widest audience possible, it is strongly desired that all deliverables, including all noncommercial software (including source code), software documentation, other data required to operate the software (e.g., databases), hardware designs and documentation, and technical data generated under the program, be provided with unlimited rights. Where this is not possible, it is desired that all noncommercial software (including source code), software documentation, other data required to operate the software (e.g., databases), hardware designs and documentation, and technical data generated under the program be provided as a deliverable to the Government, with a minimum of government purpose rights. Therefore, to the greatest extent feasible, proposers should not include background proprietary software and technical data as the basis of their proposed approach. If proposers desire to use or deliver proprietary software or technical data or both as the basis of their proposed approach, in whole or in part, they should: (1) clearly identify such software/data and its proposed particular use(s); (2) explain how the Government will be able to reach its program goals (including transition) within the proprietary model offered; and (3) provide possible nonproprietary alternatives in any area that might present transition difficulties or increased risk or cost to the Government under the proposed proprietary solution.

   Participants may be required to execute appropriate nondisclosure agreements (NDAs) and/or memoranda of understanding (MOUs) with other participants in order to facilitate the sharing of information within a design team or among research performers, research integration performers, military vehicle experts, and the Red Team assessment performer.

   Proposers expecting to use, but not to deliver, commercial open source tools or other materials in implementing their approach may be required to indemnify the Government against legal liability arising from such use.

All references to "unlimited rights" or "government purpose rights" are intended to refer to the definitions of those terms as set forth in the Defense Federal Acquisition Regulation Supplement (DFARS) Part 227.

a. Procurement Contracts

- **Noncommercial Items (Technical Data and Computer Software):** Proposers responding to this BAA requesting a procurement contract shall identify all noncommercial technical data and computer software that it plans to generate, develop, and/or deliver under any proposed award instrument in which the Government will acquire less than unlimited rights and to assert specific restrictions on those deliverables. Proposers shall follow the format under DFARS 252.227-7017 for this stated purpose (information on DFARS is at http://farsite.hill.af.mil/vfdfara.htm).

  The following format may be used for this list:

NONCOMMERCIAL				
Technical Data Computer Software To be Furnished With Restrictions	Summary of Intended Use in the Conduct of the Research	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(Narrative)	(LIST)	(LIST)	(LIST)

  In the event proposers does not submit the list, the Government will assume that it automatically has unlimited rights to all noncommercial technical data and computer software generated, developed, and/or delivered under any award instrument, unless it is substantiated that development of the noncommercial technical data and computer software occurred with mixed funding. If mixed funding is anticipated in the development of noncommercial technical data and computer software generated, developed, and/or delivered under any award instrument, proposers should identify the data and software in question as subject to government purpose rights (GPR). In accordance with DFARS 252.227-7013, "Rights in Technical Data - Noncommercial Items," and DFARS 252.227-7014, "Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation," the Government will automatically assume that any such GPR restriction is limited to a period of five (5) years in accordance with the applicable DFARS clauses, at which time the Government will acquire unlimited rights unless the parties agree otherwise. The Government will use the list during the evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer, as may be necessary, to evaluate the proposer's assertions.

  If no restrictions are intended, the proposer should state "NONE."

- **Commercial Items (Technical Data and Computer Software):** Proposers responding to this BAA requesting a procurement contract to be issued under the FAR/DFARS shall identify all commercial technical data and commercial computer software that may be included in any noncommercial deliverables contemplated under the research effort, with any applicable restrictions on the Government's use of such commercial technical data and/or computer software. In the event proposers do not submit the list, the Government will assume there are no restrictions on the Government's use of such commercial items. The Government may use the list during the evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer to evaluate the proposer's assertions.

  If no restrictions are intended, the proposer should state "NONE."

  The following format may be used for this list:

COMMERCIAL				
Technical Data Computer Software To be Furnished With Restrictions	Summary of Intended Use in the Conduct of the Research	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(Narrative)	(LIST)	(LIST)	(LIST)

b. Other Types of Awards

Proposers responding to this BAA requesting a cooperative agreement, technology investment agreement, or other transactions shall follow the applicable rules and regulations governing these various award instruments, but in all cases should appropriately identify any potential restrictions on the Government's use of any intellectual property contemplated under those award instruments in question. This includes both noncommercial Items and commercial Items. Proposals may use a format similar to that described above. The Government may use the list as part of the evaluation process to assess the impact of any identified restrictions, and may request additional information from the proposer, to evaluate the proposer's assertions.

If no restrictions are intended, the proposer should state "NONE."

c. Patents

Proposers must include documentation proving ownership or possession of appropriate licensing rights to all patented inventions to be used for the proposed project. This includes inventions for which a patent application has been filed, may include proprietary information and is not yet publicly available. Documentation must include: the patent number, inventor name(s), assignee names (if any), filing date, filing date of any related provisional application, and summary of the patent title, with either: a representation of invention ownership, or proof of possession of appropriate licensing

rights in the invention (i.e., an agreement from the owner of the patent granting license to the proposer).

d. Intellectual Property Representations

Proposers should provide a good faith representation of either ownership or possession of appropriate licensing rights to all other intellectual property to be used for the proposed project. Proposers shall provide a short summary for each item asserted with less than unlimited rights that describes the nature of the restriction and the intended use of the intellectual property in the conduct of the proposed research.

3. **Human Use:** All research involving human subjects, to include use of human biological specimens and human data, selected for funding must comply with Federal regulations for human subject protection. Further, research involving human subjects that is conducted or supported by the DoD must comply with 32 CFR 219, "Protection of Human Subjects" http://www.access.gpo.gov/nara/cfr/waisidx_07/32cfr219_07.html, and DoD Directive 3216.02, "Protection of Human Subjects and Adherence to Ethical Standards in DoD-Supported Research" (http://www.dtic.mil/whs/directives/corres/pdf/321602p.pdf).

   Institutions awarded funding for research involving human subjects must provide documentation of a current Assurance of Compliance with Federal regulations for human subject protection, for example a Department of Health and Human Services, Office of Human Research Protection Federal Wide Assurance (http://www.hhs.gov/ohrp). All institutions engaged in human subject research, to include subcontractors, must have a valid assurance. In addition, personnel involved in human subjects research must document the completion of appropriate training for the protection of human subjects.

   For all research that will involve human subjects in the first year or phase of the project, the institution must submit evidence of a plan for review by an institutional review board (IRB) as part of the proposal. The IRB conducting the review must be the IRB identified on the institution's Assurance of Compliance. The protocol, separate from the proposal, must include a detailed description of the research plan, study population, risks and benefits of study participation, recruitment and consent process, data collection, and data analysis. The designated IRB should be consulted for guidance on writing the protocol. The informed consent document must comply with Federal regulations (32 CFR 219.116). A valid Assurance of Compliance and evidence of appropriate training by all investigators should all accompany the protocol for review by the IRB.

   In addition to a local IRB approval, a headquarters-level human subjects regulatory review and approval is required for all research conducted or supported by DoD. The Army, Navy, or Air Force office responsible for managing the award can provide guidance and information about their component's headquarters-level review process. Confirmation of a current Assurance of Compliance and appropriate human subjects protection training is required before headquarters-level approval can be issued.

The time required to complete the IRB review/approval process will vary depending on the complexity of the research and/or the level of risk to study participants; ample time should be allotted to complete the approval process. The IRB approval process can last between 1 to 3 months, followed by a DoD review that could last 3 to 6 months. No DoD/DARPA funding may be used toward human subjects research until all approvals are granted.

4. **Animal Use:** Award recipients performing research, experimentation, or testing involving the use of animals shall comply with the rules on animal acquisition, transport, care, handling, and use in:

   - 9 CFR parts 1-4, Department of Agriculture rules that implement the Laboratory Animal Welfare Act of 1966, as amended, (7 U.S.C. 2131-2159);

   - Guidelines described in National Institutes of Health Publication No. 86-23, "Guide for the Care and Use of Laboratory Animals"; and

   - DoD Directive 3216.01, "Use of Laboratory Animals in DoD Program."

   For projects anticipating animal use, proposals should briefly describe plans for Institutional Animal Care and Use Committee (IACUC) review and approval. Animal studies in the program will be expected to comply with the "Public Health Service Policy on Humane Care and Use of Laboratory Animals" at http://grants.nih.gov/grants/olaw/olaw.htm.

   All award recipients must receive approval by a DoD-certified veterinarian, in addition to IACUC approval. No animal studies may be conducted using DoD/DARPA funding until the U.S. Army Medical Research and Materiel Command Animal Care and Use Review Office (ACURO) or other appropriate DoD veterinary office(s) grant approval. As a part of this secondary review process, the recipient will be required to complete and submit an ACURO Animal Use Appendix (https://mrmc.amedd.army.mil/index.cfm?pageid=Research_Protections.acuroAnimalAppendix).

5. **Publication Approval:** It is DoD policy that the publication of products of fundamental research will remain unrestricted to the maximum extent possible. Contracted fundamental research:

   > … includes [research performed under] grants and contracts that are (a) funded by budget category 6.1 (Basic Research), whether performed by universities or industry or (b) funded by budget category 6.2 (Applied Research) and performed on-campus at a university. The research shall not be considered fundamental in those rare and exceptional circumstances where the applied research effort presents a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense,

and where agreement on restrictions have been recorded in the contract or grant.

Such research is referred to by DARPA as "Restricted Research."

Pursuant to DoD policy, research performed under grants, cooperative agreements and contracts that are (a) funded by budget category 6.2 (Applied Research) and not performed on-campus at a university or (b) funded by budget category 6.3 (Advanced Research) does not meet the definition of fundamental research. Publication restrictions will be placed on all such research.

It is anticipated that awards for both Fundamental and Restricted Research may be made as a result of this BAA. Appropriate clauses will be included in resultant awards for Restricted Research to prescribe publication requirements and other restrictions, as appropriate. DARPA does not anticipate applying publication restrictions of any kind to individual awards for Fundamental Research that may result from this BAA.

Proposers are advised that, if cooperative agreements are proposed as the award instrument, DARPA may determine that research resulting from the proposed effort will present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense and may elect to use other award instruments. Any award resulting from such a determination will include a requirement for DARPA permission before publishing any information or results on the effort and will be considered restricted research.

For certain projects, even if the effort being performed by the prime contractor is restricted research, a subcontractor may be performing contracted fundamental research. In these cases, it is the prime contractor's responsibility to explain in the proposal why the subcontractor's effort will be contracted fundamental research.

The following statements or similar provisions will be incorporated into any resultant restricted research or nonfundamental research procurement contract or other transaction:

> There shall be no dissemination or publication, except within and between the contractor and any subcontractors, of information developed under this contract or contained in the reports to be furnished pursuant to this contract without prior written approval of the DARPA Public Release Center (PRC). All technical reports will be given proper review by appropriate authority to determine which distribution statement is to be applied prior to the initial distribution of these reports by the contractor. With regard to subcontractor proposals for contracted fundamental research, papers resulting from unclassified contracted fundamental research are exempt from prepublication controls and this review requirement, pursuant to DoD Instruction 5230.27 "Presentation of DoD-Related Scientific and Technical Papers at Meetings."

When submitting material for written approval for open publication, the contractor/awardee must submit a request for public release to the DARPA PRC and include the following information: 1) Document Information: title, author, short plain-language description of technology discussed in the material (approximately 30 words), number of pages (or minutes of video) and document type (briefing, report, abstract, article, or paper); 2) Event Information: type (conference, principle investigator meeting, article or paper), date, and desired date for DARPA's approval; 3) DARPA Sponsor: DARPA program manager, DARPA office, and contract number; and 4) Contractor/Awardee's information: POC name, email and telephone. Four weeks should be allowed for processing; due dates under 4 weeks may require justification. Unusual electronic file formats may require additional processing time. Requests can be sent either via email to prc@darpa.mil or mail to 3701 North Fairfax Drive, Arlington VA 22203-1714, 571-218-4235.

More information regarding DARPA's public release process may be found at http://www.darpa.mil/NewsEvents/Public_Release_Center/Public_Release_Center.aspx.

6. **Export Control:** The following clause will be included in all procurement contracts, and may be included in other transactions as deemed appropriate:

(a) "Export-controlled items," as used in this clause, means items subject to the Export Administration Regulations (EAR) (15 CFR Parts 730-774) or the International Traffic in Arms Regulations (ITAR) (22 CFR Parts 120-130). The term includes:

1) "Defense items," defined in the Arms Export Control Act, 22 U.S.C. 2778(j)(4)(A), as defense articles, defense services, and related technical data, and further defined in the ITAR, 22 CFR Part 120.
2) "Items," defined in the EAR as "commodities," "software," and "technology," terms that are also defined in the EAR, 15 CFR 772.1.

(b) The contractor shall comply with all applicable laws and regulations regarding export-controlled items, including, but not limited to, the requirement for contractors to register with the Department of State in accordance with ITAR. The contractor shall consult with the Department of State regarding any questions relating to compliance with ITAR and shall consult with the Department of Commerce regarding any questions relating to compliance with EAR.

(c) The contractor's responsibility to comply with all applicable laws and regulations regarding export-controlled items exists independent of, and is not established or limited by, the information provided by this clause.

(d) Nothing in the terms of this contract adds, changes, supersedes, or waives any requirements of applicable Federal laws, Executive orders, and regulations, including but not limited to—

(1) The Export Administration Act of 1979, as amended (50 U.S.C. App.2401, et seq.);
(2) The Arms Export Control Act (22 U.S.C. 2751, et seq.);
(3) The International Emergency Economic Powers Act (50 U.S.C. 1701, et seq.);
(4) The Export Administration Regulations (15 CFR Parts 730-774);
(5) The International Traffic in Arms Regulations (22 CFR Parts 120-130); and
(6) Executive Order 13222, as extended;

(e) The Contractor shall include the substance of this clause, including this paragraph in all subcontracts.

7. **Electronic and Information Technology:** All electronic and information technology acquired through this solicitation must satisfy the accessibility requirements of Section 508 of the Rehabilitation Act (29 U.S.C. § 794d) and FAR Subpart 39.2. Each project team involving the creation or inclusion of electronic and information technology must ensure that Federal employees with disabilities will have access to and use of information that is comparable to the access and use by Federal employees who are not individuals with disabilities, and members of the public with disabilities seeking information or services from DARPA will have access to and use of information and data that is comparable to the access and use of information and data by members of the public who are not individuals with disabilities.

8. **Employment Eligibility Verification:** Per FAR 22.1802, recipients of FAR-based procurement contracts must enroll as Federal contractors in E-verify (http://www.uscis.gov/portal/site/uscis) and use the system to verify employment eligibility of all employees assigned to the award. All resultant contracts from this solicitation will include a clause from FAR 52.222-54, "Employment Eligibility Verification." This clause will not be included in cooperative agreements or other transactions.

9. **Reporting Executive Compensation and First-Tier Subcontract Awards:** Per FAR 4.1403, FAR-based procurement contracts of $25,000 or more will include a clause from FAR 52.204-10, "Reporting Executive Compensation and First-Tier Subcontract Awards." A similar award term will be used in cooperative agreements and other transactions. This clause is not required in classified contracts.

10. **Updates of Information Regarding Responsibility Matters:** Per FAR 9.104-7(c), FAR-based procurement contracts more than $500,000 and if the proposer has active Federal contracts and grants with a total value more than $10,000,000, will include a clause from FAR 52.209-9 "Updates of Publically Available Information Regarding Responsibility Matters."

11. Representation by Corporations Regarding Unpaid Delinquent Tax Liability or a Felony Conviction Under Any Federal Law: Each proposer must complete and return the representations in paragraph (b) below with their proposal submission.

(a) In accordance with sections 8124 and 8125 of Division A of the Consolidated Appropriations Act, 2012 (Pub. L. 112-74) none of the funds made available by that Act may be used to enter into a contract with any corporation that –

(1) Has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability, unless the agency has considered suspension or debarment of the corporation and made a determination that this further action is not necessary to protect the interests of the Government.

(2) Was convicted of a felony criminal violation under any Federal law within the preceding 24 months, where the awarding agency is aware of the conviction, unless the agency has considered suspension or debarment of the corporation and made a determination that this action is not necessary to protect the interests of the Government.

(b) The Proposer represents that –

(1) It is [ ] is not [ ] a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability,

(2) It is [ ] is not [ ] a corporation that was convicted of a felony criminal violated under Federal law within the preceding 24 months.

12. Cost Accounting Standards Notices and Certification (Deviation 2012-00003 (JAN 2012): As per FAR 52.230-2, amended by Deviation 2012-00003 (JAN 2012), any procurement contract in excess of $700,000 resulting from this solicitation will be subject to the requirements of the Cost Accounting Standards Board (48 CFR Chapter 99), except those contracts which are exempt as specified in 48 CFR 9903.201-1. Any proposer submitting a proposal which, if accepted, will result in a cost accounting standards (CAS) compliant contract, must submit representations and a Disclosure Statement as required by 48 CFR 9903.202 detailed in FAR 52.230-2.

C. Reporting

The number and types of technical and financial reports required under the contracted effort will be specified in the award document, and will include, as a minimum, monthly financial status reports and a yearly status summary. The reports shall be prepared and submitted in

accordance with the procedures contained in the award document. A final report that summarizes the project and tasks will be required at the conclusion of the performance period for the award.

D. Electronic Systems

1. **Central Contractor Registration (CCR) and Universal Identifier Requirements:** Unless the proposer is exempt from this requirement, as per FAR 4.1102 or 2 CFR 25.110, as applicable, all proposers must be registered in the Central Contractor Registration (CCR) and have a valid Data Universal Numbering System (DUNS) number. Information on CCR registration is available at http://www.ccr.gov. All proposers must provide the DUNS number in each proposal they submit.

   Proposers requesting an assistance instrument (e.g., Cooperative Agreements) must be registered in CCR prior to submitting a proposal. DARPA cannot make an assistance award to a proposer until the proposer has provided a valid DUNS number and has maintained an active CCR registration with current information. All other proposers must be registered prior to award. All proposers must maintain an active CCR registration with current information at all times during which they have an active Federal award.

2. **Representations and Certifications:** In accordance with FAR 4.1201, prospective proposers shall complete electronic annual representations and certifications. Information may be found at http://www.darpa.mil/Opportunities/Contract_Management/Representations_and_Certifications.aspx.

3. **Wide Area Work Flow (WAWF):** Performers are required to submit invoices for payment directly at https://wawf.eb.mil/. WAWF registration is required prior to any award under this BAA.

4. **i-Edison:** The award document for each proposal selected for funding will contain a requirement for patent reports and notifications to be submitted electronically through the i-Edison Federal patent reporting system at (http://s-edison.info.nih.gov/iEdison).

5. **Technical – Financial Information Management System (T-FIMS):** Financial and Technical status reports must be submitted electronically at https://www.tfims.darpa.mil.

VII. AGENCY CONTACTS

DARPA will use email for all technical and administrative correspondence regarding this BAA.

- Technical POC: Dr. Kathleen Fisher, Program Manager, DARPA I2O

- Email: HACMS@darpa.mil

- Current Mailing address:

  DARPA I2O
  ATTN: DARPA-BAA-12-21
  3701 North Fairfax Drive
  Arlington, VA 22203-1714

  Beginning April 2, 2012:

  DARPA I2O
  ATTN: DARPA-BAA-12-21
  675 North Randolph Street
  Arlington, VA 22203-2114

- Website: http://www.darpa.mil/Opportunities/Solicitations/I2O_Solicitations.aspx

VIII. OTHER INFORMATION

A. Frequently Asked Questions (FAQs)

Administrative, technical, and contractual questions should be sent via email to HACMS@darpa.mil. All requests must include the name, email address, and the phone number of a point of contact.

DARPA will attempt to answer questions in a timely manner; however, questions submitted within 7 days of initial closing may not be answered. If applicable, DARPA will post FAQs and answers to http://www.darpa.mil/Opportunities/Solicitations/I2O_Solicitations.aspx.

B. Proposer's Day

A Proposers' Day was held February 21, 2012, in Arlington, VA. Attendance at the Proposers' Day was voluntary and was not required to propose to this solicitation.

Materials presented at the Proposers' Day, as well as a frequently asked questions (FAQ) document, are available at: http://www.darpa.mil/Opportunities/Solicitations/I2O_Solicitations.aspx.

The HACMS Proposers' Day was recorded, and a copy of the video is posted on DARPA's website until April 30, 2012.

C. Submission Checklist

The following items apply prior to proposal submission:

✓	Item	BAA Section	Applicability	Comment
	Obtain DUNS number	IV.B.1.a	Required on proposal cover page	http://fedgov.dnb.com/webform/index.jsp The DUNS Number is the Federal Government's contractor identification code for all procurement-related activities.
	Enroll in Central Contractor Registration (CCR) database	IV.B.1.a	Required of all proposers Note, proposers requesting an assistance instrument (e.g., Grants, Cooperative Agreements) must be registered in CCR prior to proposal submission. All other proposers must be registered prior to award.	https://www.bpn.gov/CCR/default.aspx The CCR is the primary registrant database for the U.S. Federal Government.
	Obtain Taxpayer Identification Number (TIN)	IV.B.1.a	Required on proposal cover page	http://www.irs.gov/businesses/small/international/article/0,,id=96696,00.html A TIN is used by the Internal Revenue Service in the administration of tax laws.

	Obtain CAGE code	IV.B.1.a	Required on proposal cover page	https://www.dlis.dla.mil/CAGESearch/cage_faq.asp A CAGE Code identifies companies doing or wishing to do business with the Federal Government.
	Enroll in E-Verify	VI.B.8	Applies to FAR-based contracts, not to grants, cooperative agreements, or other transactions	http://www.uscis.gov/e-verify E-Verify is an Internet-based system that allows businesses to determine the eligibility of their employees to work in the United States.
	Ensure representations and certifications are up to date	VI.D.2	Required of all proposers	https://orca.bpn.gov/ Online Representations and Certifications Application (ORCA) is an e-Government initiative designed by the Integrated Acquisition Environment to replace the paper-based representations and certifications process.
	Ensure eligibility of all team members	III	Required of all proposers (primes and subcontractors)	Verify eligibility, as applicable, for FFRDCs, Government entities, organizational conflict of interest

The following items apply as part of the submission package:

✓	Item	BAA Section	Applicability	Comment
	Encryption password	IV.D.2.a	Required of proposers using the DARPA BAA Submission System	Email to HACMS@darpa.mil
	Volume I (Technical and Management)	IV.B.1	Required of all proposers	limited to 30 pages plus 10 for each additional Technical Area proposed
	Appendix A	IV.B.1.k	Required of all proposers	- Information on team member identification - Government/FFRDC team members - Organizational conflict of interest (SETA) affirmations - Intellectual property - Human use - Animal use - Subcontractor plan
	Appendix B	IV.B.1.l	Optional	May include links to relevant papers, reports, videos or resumes
	Classified Appendix	I.Technical Area 1: Military Vehicle Expert	As required by proposers to Technical Area 1	- Follow submission instructions of section IV.D.3 - Pages in this appendix count against page limit for Volume 1
	Volume II (Cost)	IV.B.2	Required of all proposers	- Cover Sheet - Cost summary by phase and year - Detailed cost information by task/month – include costs for direct labor, indirect costs/rates, materials/equipment, subcontractors/ consultants, travel, other direct costs – Justification for labor costs, categories and hours - Cost spreadsheet file (.xls or equivalent format) If applicable, be sure to include: - List of milestones for 845 OTA agreements

				- Subcontractor cost proposals if not sent directly to DARPA - Consultant agreements, teaming agreements or letters of intent - Itemized list of material and equipment items to be purchased - Vendor quotes or engineering estimates for material and equipment more than $50,000 - Travel cost estimate to include purpose, departure and arrival destinations, and sample airfare