Broad Agency Announcement

META

Tactical Technology Office

DARPA-BAA-10-21

December 18, 2009

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Part One: Overview Information

- **Federal Agency Name** – Defense Advanced Research Projects Agency (DARPA), Tactical Technology Office
- **Funding Opportunity Title –** META
- **Announcement Type –** Initial Announcement
- **Funding Opportunity Number –** Broad Agency Announcement (DARPA-BAA-10-21)
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – Not Applicable
- **Dates**
    - Posting Date: December 18, 2009
    - Proposal Due Date: 4:00pm Eastern, February 18, 2010
- **Anticipated individual awards** – Multiple awards are anticipated
- **Types of instruments that may be awarded** – Procurement contract or other transaction
- **Agency contact –** The BAA Coordinator for this effort can be reached at DARPA-BAA-10-21@darpa.mil

Part Two: Full Text of Announcement

I. FUNDING OPPORTUNITY DESCRIPTION

The Defense Advanced Research Projects Agency often selects its research efforts through the Broad Agency Announcement (BAA) process. The BAA will appear first on the FedBizOpps website, http://www.fedbizopps.gov/, and Grants.gov website at http://www.grants.gov/. The following information is for those wishing to respond to the BAA.

A. Background

DARPA is soliciting innovative research proposals to substantially improve the design, integration/manufacturing, and verification of complex cyber-physical systems,[1] and particularly aerospace and defense systems such as aircraft, rotorcraft, and ground vehicles. Proposed research should investigate innovative approaches that enable revolutionary advances in this area. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice. The proposed effort will culminate with the development of a complex advanced air and/or ground platform employing the new approach and demonstrating dramatic improvement in development time (and ultimately level of effort and cost).

The ultimate goal of the META program is to make a dramatic improvement on the existing systems engineering, integration, and testing process for defense systems. META is not predicated on one particular alternative approach, metric, technique, or tool. Broadly speaking, however, it aims to develop model-based design methods for cyber-physical systems far more complex and heterogeneous than those to which such methods are applied today; to combine these methods with a rigorous deployment of hierarchical abstractions throughout the system architecture; to optimize system design with respect to an observable, quantitative measure of complexity for the entire cyber-physical systems; and to apply probabilistic formal methods to the system verification problem, thereby dramatically reducing the need for expensive real-world testing and design iteration.

The principal impetus behind the META program is the observation that, while the complexity of aerospace and defense systems has grown considerably over the past half-century, the systems engineering approach—or, more specifically, the design, integration/manufacturing, and test flow[2]—is little changed since its inception in the course of the Atlas missile development and Apollo programs, and its subsequent codification in MIL-STD-499.[3] In fact, a comparison between this McNamara-vintage

[1] We use the term "cyber-physical system" to refer to systems that derive significant portions of their functionality from both software and electromechanical systems. Virtually all defense platforms (e.g., aircraft, spacecraft, naval vessels, ground vehicles, etc.) and systems-of-systems are encompassed by this rubric, as are automobiles, power grids, air traffic control systems, and integrated circuits.
[2] We use the term "flow" in preference to the word "process" to refer to the actual series of activities, steps, and events that take place to effectuate the design, the integration, or the verification testing of a system.
[3] See Thomas P. Hughes, *Rescuing Prometheus*, Pantheon Books (1998) (describing the history of the Atlas development effort); David A. Mindell, *Digital Apollo*, MIT Press (2008) (describing the history of the

standard and modern best practices suggests that the same basic series of steps remain the cornerstone of our approach to the development of complex systems: functional decomposition, requirements flow-down and allocation, size/weight/power minimization at the subsystem and component level as a proxy for cost minimization, and multiple integration-test-redesign loops, followed by quasi-exhaustive system-level verification testing. This framework has served the aerospace, defense, and a number of other industries well for some time, while the complexity of the underlying systems has increased by several orders of magnitude.

The duration and cost of system development efforts, however, has experienced rapid exponential growth over time.[4] Although a variety of theories have been proffered for the underlying cause of this alarming trend, the rapid increase in system complexity—the number of system states, quantity of components, modalities of inter-component interactions, software code size, etc.—and the frequent failure of the design organization to cope with it is a recurring theme that accompanies with increasing frequency and severity the development of most modern aircraft, spacecraft, naval vessels, terrestrial platforms, and systems-of-systems. The overarching objective of the META program is to devise, implement, and demonstrate in practice a radically different approach to the design, integration/manufacturing, and verification of these systems that substantially enhance the designer's ability to manage system complexity and mitigate the ill effects thereof.

It is instructive to consider the design flows and resultant architectures of complex systems in other domains. Thus, for instance, the integrated circuit industry has likewise had to endure an exponential increase in system complexity. Driven by competitive constraints on time-to-market for new products, however, it was unwilling to accommodate growth in product development times. Consequently, the early 1980s saw a dramatic shift from manual layout techniques—which were prompting significant testing and re-design efforts for each new product—to structured design methods employing model-based composition techniques and rigorously-enforced hierarchical abstractions to produce correct-by-construction designs for chips of ever-increasing complexity. Such model-based design techniques have also proliferated in the software arena, where the problem is made significantly easier by the existence of truly ideal abstractions and perfect component models, enabling (at least in the simpler cases) mathematically-rigorous correctness of the resulting code.[5] The application of model-based design

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Apollo development effort); United States Air Force, "System Engineering Management," MIL-STD-499 (1969).

[4] See, e.g, Mark V. Arena, Obaid Younossi, et al., *Why Has the Cost of Fixed-Wing Aircraft Risen?*, Report No. MG696, RAND Corporation (2008) (documenting aircraft cost growth at 8-12%/year and attributing it primarily to increased complexity); Paul G. Kaminski et al., *Pre-Milestone A and Early-Phase Systems Engineering*, National Research Council (2008) (providing representative development times of major historical and recent defense programs).

[5] An excellent survey of model-based design techniques for both electronic and software systems is Alberto Sangiovanni-Vincentelli, "Quo Vadis SLD? Reasoning About the Trends and Challenges of System Level Design," *Proceedings of the IEEE*, Vol. 95, No. 3 (March 2007). See also Edward A. Lee, "Cyber Physical Systems: Design Challenges," Technical Report No. UCB/EECS-2008-8, University of California (2008) (available at http://www.eecs.berkeley.edu/Pubs/TechRpts/2008/EECS-2008-8.pdf); Alberto Sangiovanni-

techniques in both the integrated circuit and software arenas does not come for free: it imposes a variety of constraints and penalties on the resultant product (e.g., chips accept a synchronous operation constraint and are undoubtedly not the minimum-size or minimum-power designs; software suffers a significant penalty in code size), but they enable the effective management of complexity, and the schedule and cost associated with design and verification.[6]

Application of model-based design methods to other domains such as structures, engines, thermal management systems, etc.—areas where there is tremendous heterogeneity of components and where challenging physics may significantly complicate component models— undoubtedly present unique challenges. The potential pay-offs, however, are dramatic. Thus, for instance, the DARPA Accelerated Insertion of Materials (AIM) program demonstrated 2X schedule and labor reduction for the substitution of a novel structural material into an aerostructure using a model-based framework that relied on the characterization of a small number of material coupons.[7]

It is also notable that biological systems—even while their "development process" might be inscrutable, or at least not readily applicable to engineering systems—tend to employ similar architectural constructs of multiple, rigorously-enforced hierarchical abstraction layers throughout the system. Undoubtedly such abstractions introduce inefficiencies into the biological system as seen through the lens of traditional engineering metrics such as size, weight, and power consumption. One suspects, however, that these abstractions are essential to managing the construction, evolution, and adaptation to change of systems whose complexity is still many orders of magnitude greater than that with which the engineering community struggles today.[8]

This observation might also prompt us to consider whether the principal design metrics employed today: size, weight, and power, are really the rights ones for evaluating the fitness of engineering designs. Or, if a more sophisticated set of metrics capturing the complexity and adaptability of a particular architecture or design, might incentivize the kinds of favorable artifacts that make biological systems successful. The software world may provide some insight into the development of new complexity metrics. The antiquated measure of source lines of code (SLOC) has been supplanted with function points, cyclomatic complexity measures, and—at least in a theoretical sense—algorithmic (Kolmogorov) and information content (Shannon) type metrics.[9] The ability to identify comparable—and even commensurate—metrics for electromechanical or cyber-physical systems would be significantly enabling for the performance of the

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Vincentelli, "Is a Unified Methodology for System-Level Design Possible?" *IEEE Design & Test of Computers*, Vol. 25, No. 4 (July/August 2008).

[6] An instructive software example is described in Scott Rosenberg, "Anything You Can Do, I Can Do Meta," *Technology Review*, Vol. 101 (January/February 2007).

[7] See http://www.darpa.mil/dso/thrusts/matdev/aim/index.html for assorted results and references.

[8] This hypothesis is explored in detail by Marc W. Kirschner & John C. Gerhart, *The Plausibility of Life*, Yale University Press (2005).

[9] Lest one think that there is a paucity of options for complexity metrics, see Seth Lloyd, "Measures of Complexity: A Nonexhaustive List," *IEEE Control Systems Magazine*, Vol. 24, No. 4 (August 2001).

elusive hardware-software trade that is almost never in the toolset of today's designers of complex systems.

B. Program Overview

The top-level technical objectives of the META program are as follows:

- Develop practical, observable metric of complexity for cyber-physical systems to enable cyber-vs-physical implementation trades and to improve parametrization of cost and schedule;
- Develop a quantitative metric of adaptability associated with a given system architecture that can support trade-offs between adaptability, complexity, performance, cost, schedule, risk, and other system attributes;
- Develop a structured design flow employing hierarchical abstraction and model-based composition of electromechanical and software components;
- Develop a component and manufacturing model library for a given airborne or ground vehicle systems domain through extensive characterization of desirable and spurious interactions, dynamics, and properties of all constituent components down to the numbered part level; develop context models to reflect various operational environments;
- Develop a verification flow that generates probabilistic "certificates of correctness" for the entire cyber-physical system based on stochastic formal methods, scaling linearly with problem size;
- Apply the above framework and toolset to design, manufacture, integrate, and verify an air and/or ground vehicle of substantial complexity 5X faster than with a conventional design/build/test approach.

The META program will be structured in three phases, with the first phase consisting of two sub-phases:

Phase 1a: Design Flow, Metrics, and Tools Development (9 months)
Phase 1b: Toolset Implementation (6 months)
Phase 2: Component and Manufacturing Model Library Development (12 months)
Phase 3: Rapid Development Demo (15+ months)

The program will culminate, in Phase 3, with the complete development and acceptance testing to developmental test standards of an air and/or ground vehicle which will be representative of a cyber-physical system of substantial complexity. The detailed specification of the demo platform will not be announced prior to Phase 3, at which point the Phase 3 performer will be expected to demonstrate that system design, integration/manufacturing, and verification can be accomplished with a > 5X schedule compression over a traditional development process for a comparable system. (It is possible that both air and ground vehicle rapid development demos would be pursued.)

Phases 1a, 1b, and 2 will be geared toward developing the infrastructure necessary to enable the rapid and adaptable development cycle to be demonstrated in Phase 3. In

Phase 1, the performer(s) will refine their proposed approaches to each of the key program elements outlined above. In the first sub-phase (Phase 1a), this will culminate in completion of complexity metric development and parametrization, a detailed description and process model for the design, integration/manufacturing, and verification flows, and the application of this process model to at least one hypothetical system. In the second sub-phase (Phase 1b), the performer(s) will implement full-fledged, usable versions of the necessary supporting tools and further refine their approaches for the design and verification flows, culminating again in the application of the now-complete toolset to a hypothetical system.

At the commencement of Phase 2, DARPA will announce to the performer(s) the general domain of application in which the Phase 3 rapid development demo will be pursued. The performer will then select and characterize an appropriate manufacturing and component library needed to design, integrate, and verify an arbitrary system in the specified air or ground vehicle system domain. This will require the development of detailed component models and likely entail substantial real-world component, coupon, etc. testing.

DARPA is soliciting proposals for Phases 1a, 1b, and 2. Phases 1b and 2 should be included as priced options to the Phase 1a proposal. Funding decisions for each phase will be determined by a Scientific Review Panel based satisfaction of program metrics and objectives, and the availability of funds, among other considerations. Proposers are encouraged to describe in the proposal their Phase 3 approach and qualifications; the submission of Phase 3 pricing information is impractical, however, given that the demonstration platform has not been specifically identified.

Proposers will be evaluated on their anticipated ability to successfully perform for the duration of the program, including Phase 3, and should structure their teaming arrangements accordingly.[10] DARPA is only interested in complete solutions to this BAA. Technology developers and academia with expertise in specific component areas are encouraged to team with a system or platform developer.

C. Phase 1a Objectives & Deliverables

Phase 1a will have a 9-month period of performance. Up to three awards, each valued up to $4.0 million, are anticipated.

<u>The phase objectives are as follows:</u>

(1) To develop a quantitative complexity metric usable for making design decisions. The metric should possess the following attributes:

(a) it should be readily observable—perhaps with the aid of a tool—at every level of the system from the system level down to the component level;

[10] Given that the Phase 3 demo could include an aircraft, rotorcraft, or ground vehicle, proposers will have the opportunity to augment their team in their Phase 3 proposal. However, the capability to develop vehicle platforms of substantial complexity and to perform large-scale system integration should be present in each team proposing under this BAA.

(b) it should correlate well to the effort (cost, schedule, and variance thereof) associated with system development (design, integration/manufacturing, and verification) and lifecycle sustainment (upgrades, changes, and maintenance);
(c) it should correlate well with *observed* system reliability (failures from anticipated and unanticipated modes);
(d) it should enable trade-offs between functionality implemented in hardware and in software, i.e., the metric should capture both types of complexity of a cyber-physical system and enable trades between the two.

(2) To develop a quantitative metric of adaptability associated with a given system architecture that can support trade-offs between adaptability, complexity, performance, cost, schedule, risk, and other system attributes.

(3) To develop a design flow for cyber-physical systems that has the following characteristics:
(a) it enables design optimization with respect to a complexity metric as described in objective (1) above;
(b) it enables trade-offs between complexity, traditional system attributes, and adaptability, as described in objective (2) above;
(c) it enables the optimal introduction of hierarchical abstraction layers into the design process and into the resultant system architecture, and is capable of dealing with the effect of "leaky"—or imperfect—abstractions on the system design and verification process ;
(d) it enables the rigorous exploration of large, multi-dimensional design trade-spaces;
(e) it enables the representation of components and manufacturing technologies using an existing or novel formal modeling language and the rapid assessment of the impact of different components and manufacturing technologies on the design and vice versa;
(f) it enables the synthesis of designs that are "correct-by-construction," i.e., that require minimal redesign due to emergent behaviors or unexpected interactions;
(g) as applied to a complex airplane, rotorcraft, or ground vehicle, it enables a > 5X compression in the design schedule versus status quo design, integration, and test approach.

(4) To be able to verify that the entire cyber-physical system will function correctly and estimate its reliability without resort to real-world testing, such that:
(a) a probabilistic "certificate of correctness" for the system can be obtained through model verification to a given level of confidence given the uncertainty in the component and manufacturing models;
(b) if a system changes configuration due to intentional adaptation or through some failure scenario, it can be rapidly re-verified;
(c) an estimate of reliability (and the uncertainty in the estimate) for the entire cyber-physical system can be computed without real-world testing to include single- and multi-mode failure scenarios;
(d) verification is accomplished > 5X compression in schedule versus the status quo.

The deliverables for Phase 1a shall be as follows:

(A) Complexity Metric & Parametric Model Review (ATP + 3 months): The performer shall present accomplishments with respect to objectives (1) and (2), and present the results of parametric modeling of cost and schedule with respect to complexity.

(B) Design, Integration, and Verification Flow Review (ATP + 5 months): The performer shall present accomplishments with respect to objectives (3) and (4), and explain the processes through an end-to-end walk-through of a simple design and verification problem for a relevant system.

(C) Modeling Language Review (ATP + 6 months): The performer shall present their chosen representation language for formal modeling of the system and its constituent components. The complete semantics of the modeling language should be selected and specified at this point. An initial estimate of model uncertainty propagation from the component to the system level should be undertaken and described at this milestone.

(D) Notional Demo System Application Review (ATP + 7 months): The performer shall present an application of the design and verification processes devised to a notional air or ground vehicle demonstration system of substantial complexity. In the absence of appropriate tools and component libraries, the application will necessarily be simplified so as to showcase the salient features of the design and verification processes, and resulting system architecture.

(E) Phase 1a Final Review (ATP + 8 months): The performer shall provide a comprehensive review of all progress since the beginning of the phase. All outstanding actions from prior reviews should be closed by this point.

(F) Phase 1a Final Report (ATP + 9 months): No later than the end of the period of performance, the performer shall deliver a final report in the form of: (1) a technical manuscript of publishable quality and suitable for publication in a peer-reviewed journal documenting their effort in this phase, and (2) a programmatic final report containing financial data and other information not suitable for publication but appropriate for program documentation and planning.

Reviews of performer progress against the phase objectives shall take place at least monthly. Performers are free to propose other intermediate milestones and determine the precise content of each review to suit their execution plan.

DARPA anticipates funding Phase 1a with RDT&E Budget Activity 2 ("6.2"), Applied Research funds enabling academic institutions performing work on campus to participate without pre-publication review restrictions.

The Government desires to obtain Unlimited Rights to all deliverables of Phase 1a (except commercially available software) to enable their publication and industry-wide

promulgation following the conclusion of the competitive phases of the program and will evaluate the transition potential of proposals accordingly.

D. Phase 1b Objectives & Deliverables

Phase 1b will have a 6-month period of performance. Up to two options, each valued up to $10.4 million, are anticipated to be awarded for this phase.

<u>The phase objectives are as follows:</u>

(1) Complete the design of and implement all supporting tools necessary for the practical application of the design, integration, and verification flows developed in Phase 1a in the course of a real-world development effort for a complex, heterogeneous cyber-physical system, particularly in air and ground vehicle domains. This may include the development of stand-alone software, models or add-ons to existing software products, the development of specialized equipment, design heuristics, etc. —anything needed to instantiate in practice the capability to rapidly design correct-by-construction complex cyber-physical systems.

(2) Develop the detailed requirements for the component and manufacturing model library, including the necessary scope and fidelity of the library needed to support the rapid development demo in Phase 3.

<u>The deliverables for Phase 1b shall be as follows:</u>

(A) Tool Design Review (ATP + 2 months): The performer shall present a detailed design for the enabling toolset as described in objective (1).

(B) Modeling Language & Library Requirements Review (ATP + 4 months): The performer shall define and present the syntax—in addition to the previously-developed semantics—for the modeling language. The performer shall also refine the requirements for the scope and fidelity of the component and manufacturing model library to be developed in Phase 2.

(C) Notional Demo System Application Review (ATP + 5 months): The performer shall present an application of the design and verification processes devised to a notional air or ground demonstration vehicle of substantial complexity. This application should employ the toolset under development in the course of this phase. A hypothetical component library may be employed, however. The performer shall demonstrate traceability from the notional development process to the program objectives for schedule compression, complexity and cost reduction, and enhancements in architectural adaptability.

(D) Phase 1b Final Review (ATP + 5 months): The performer shall provide a comprehensive review of all progress since the beginning of the phase. All outstanding actions from prior reviews should be closed by this point.

(E) Delivery of Toolset (ATP + 6 months): The performer shall deliver the supporting design, integration, and verification tools developed in the course of the program. In the case of software, source code and executables shall be supplied. Detailed documentation shall also be supplied. (See note on intellectual property and data rights at the conclusion of this section.)

(F) Phase 1b Final Report (ATP + 6 months): No later than the end of the period of performance, the performer shall deliver a final report in the form of: (1) a technical manuscript of publishable quality and suitable for publication in a peer-reviewed journal documenting their effort in this phase, and (2) a programmatic final report containing financial data and other information not suitable for publication but appropriate for program documentation and planning.

Reviews of performer progress against the phase objectives shall take place at least monthly. Performers are free to propose other intermediate milestones and determine the precise content of each review to suit their execution plan.

DARPA anticipates funding Phase 1b with RDT&E Budget Activity 2 ("6.2"), Applied Research funds enabling academic institutions performing work on campus to participate without pre-publication review restrictions.

The Government desires to obtain Unlimited Rights to all deliverables of Phase 1b (except commercially available software) to enable their publication and industry-wide promulgation following the conclusion of the competitive phases of the program and will evaluate the transition potential of proposals accordingly. The Government anticipates releasing the toolset developed in the course of this phase to the DoD community and industrial base under an open source license at the conclusion of the META program.

E. Phase 2 Objectives & Deliverables

Phase 2 will have a 12-month period of performance. At least one option valued up to $26.0 million is anticipated to be awarded for this phase. Concurrently with the commencement of Phase 2, DARPA will announce the general domain from which the Phase 3 demo platform will be selected.

<u>The phase objectives are as follows:</u>

(1) Select and characterize the manufacturing and component library needed to design, integrate, and verify an arbitrary platform in the specified domain such that:

- (a) it can be represented in the design process developed in Phase 1, enabling manufacturing and implementation trades in the course of design optimization;
- (b) it is applicable across a broad range of disciplines present in typical aerospace and defense systems, including power systems, avionics/instrumentation, data, control systems, software, thermal management systems, structures & structural components, etc.;

(c) it develops a detailed model that represents a near-perfect abstraction of each component, including static and dynamic interactions of that component through power, data, and structural interfaces, as well as spurious (generally undesirable) interactions such as thermal, vibrations, and electromagnetic radiation;
(d) it enables the incorporation of component and manufacturing model uncertainty into the system-level verification flow developed in Phase 1.

This activity will likely involve a combination of data gathering, theoretical modeling, and actual characterization of components in a laboratory or real-world environment through measurements of thermal source characteristics, electromagnetic radiation properties, etc. The performer team will need to work closely with a wide array of component suppliers to execute this phase of the program. The long-term vision is for an industry consortium to emerge that will facilitate the promulgation of such component models.

(2) Exercise the component library in the course of an actual application of the new design and verification flows and tools to a system design in the applicable domain and employing significant portions of the library.

<u>The deliverables for Phase 2 shall be as follows:</u>

(A) Component/Manufacturing Model Library Development Plan Review (ATP + 1 month): The performer shall develop and present a detailed plan to assemble the characterization information needed to populate the component/manufacturing model library, including any laboratory testing or experimental data collection activities necessary. The scope of the library shall be clearly defined, as well as the specific attributes/models being sought for each element, the desired model uncertainty shall be specified, and the detailed approach to obtaining this information (e.g., through physics-based simulation, testing, etc.) shall be presented.

(B) Notional Demo System Application Review (ATP + 9 months): The performer shall present an application of the design and verification processes devised to a notional air or ground demonstration vehicle of substantial complexity from the general domain of systems announced at the beginning of the phase. The application should employ the full toolset developed in Phase 1 and the actual component/manufacturing library as it exists to date of this exercise. The performer shall demonstrate traceability from the notional development process to the program objectives for schedule compression, complexity and cost reduction, and enhancements in architectural adaptability.

(C) Phase 2 Final Review (ATP + 11 months): Document the development of detailed manufacturing and component libraries spanning the application domain design tradespace based on real-world characterization of components and test coupons and the quantification of model uncertainty.

(D) Delivery of Component/Manufacturing Model Library (ATP + 12 months): Deliver the data set encompassing the component model library. Detailed documentation shall

also be supplied. (See note on intellectual property and data rights at the conclusion of this section.)

(E) Phase 2 Final Report (ATP + 12 months): No later than the end of the period of performance, the performer shall deliver a final report in the form of: (1) a technical manuscript of publishable quality and suitable for publication in a peer-reviewed journal documenting their effort in this phase, and (2) a programmatic final report containing financial data and other information not suitable for publication but appropriate for program documentation and planning.

Reviews of performer progress against the phase objectives shall take place at least monthly. Performers are free to propose other intermediate milestones and determine the precise content of each review to suit their execution plan.

For the duration of Phase 2, performers will be required to provide informal, non-auditable cost and earned value (at WBS Level 3) reporting for the prime contractor and all subcontractors to include labor and materials costs on a weekly basis with no more than a one week latency (e.g., each Friday for the week ending the preceding Friday). Performers will be required to reconcile the informal weekly cost reports with their payment vouchers on a monthly basis.

During Phase 2 DARPA will announce the general characteristics of the demonstration platform sufficient for the performer to develop a Phase 3 proposal.

DARPA anticipates funding Phase 2 with RDT&E Budget Activity 2 ("6.2"), Applied Research funds enabling academic institutions performing work on campus to participate without pre-publication review restrictions.

The Government desires to obtain at least Government Purpose Rights to all deliverables of Phase 2 (except commercially available software) to enable their promulgation to DoD contractors on future procurements following the competitive phases of the program and will evaluate the transition potential of proposals accordingly.

F. Phase 3 Objectives & Deliverables

The period of performance for Phase 3 has not been determined. The number and value of awards will be determined based on the choice of a specific demonstration platform or platforms. An incentive fee-type contract may be employed, tied to the development schedule, complexity, cost or other metrics. Concurrently with the commencement of Phase 3, DARPA will announce the detailed specifications of the demonstration platform. The objectives and deliverables detailed below are notional and presented for general planning purposes of preceding phases; revisions will be issued in the course of program.

<u>The phase objectives are as follows:</u>

(1) Design, manufacture, integrate, verify, and test an aircraft, rotorcraft, or ground vehicle of substantial complexity (e.g., at least on the order of several thousand pounds weight, and potentially significantly larger), such that:

(a) the overall schedule for design, manufacturing, integration, and verification is compressed by at least five times (> 5X) over a comparable development cycle employing a traditional systems engineering, integration, and testing process;

(b) the model-based verification process, when compared to traditional ground- and flight-based testing, adequately demonstrates that the system was correct-by-design, yielding minimal or no discrepancies, faults, flaws, or unanticipated interactions;

(c) the testing-based system reliability metrics (to include both hardware and software) are within 10% of the model-based reliability predictions;

The performer may supply the Government its estimates for the metrics that would be associated with a comparable system developed through a traditional development process. Independent estimates developed by an appropriately-qualified neutral party (e.g., an FFRDC, government laboratory, or non-profit institution with no vested interest in the outcome), however, shall constitute the Government reference metrics against which any incentive fees will be computed.

<u>The deliverables for Phase 3 shall be as follows:</u>

(A) Demo System Requirements Review: The performer shall translate the demonstration system specifications into formal model constraints.

(B) WBS/IMS Baseline Review: The performer shall develop and review a detailed work plan including a 3+ level work breakdown structure (WBS) and integrated master schedule (IMS) for its Phase 3 development approach.

(C) Design Trade Space Review: The performer shall present the results of design trade space exploration based on constraints derived from system specifications and based on the space of composible systems given the library of components and manufacturing methods. This exercise will be performed at each level of abstraction in the system.

(D) System Design Review: The performer shall present details of the selected design point. The performer shall justify, with respect to cost, complexity, and adaptability metrics the optimality of the select design within the design trade space.

(E) Model-Based Design Verification: The performer shall present system verification results based on probabilistic model composition techniques. The result of the verification process—the “certificate of correctness” for the system—will necessarily be a stochastic result based on the uncertainty of the underlying model form and parameters. For adaptable features of the system, the performer shall either demonstrate that the system can be re-verified in near-real-time during operation, or will a priori verify an exhaustive set of system configurations.

(F) Manufacturing & Integration Completion Review: The performer shall provide for examination by the Government a fully-fabricated and integrated demonstration system. This milestone is significant for record-keeping and comparison purposes as the > 5X schedule compression objective runs through this milestone.

(G) Ground Acceptance Testing & Verification: The performer shall subject the demonstration system to the traditional ground acceptance testing and verification process and compare the results with the model-based verification process.

(H) Operational Acceptance Testing & Verification: The performer shall subject the demonstration system to the traditional DoD flight or ground mobility vehicle acceptance testing and verification process for operational systems (i.e., not experimental or prototype vehicles) and compare the results with the model-based verification process.

(I) Final Schedule & Cost Review: The performer shall conduct a review to compare the observed measures of schedule, cost, complexity, and other relevant system metrics to what was expected from the new development flow, and what might have been expected from the traditional development approach.

(J) Phase 3 Final Report: No later than the end of the period of performance, the performer shall deliver a final report documenting in detail the technical, programmatic, and financial aspects of the program.

Reviews of performer progress against phase objectives shall take place at least monthly.

For the duration of Phase 3, performers will be required to provide informal, non-auditable cost and earned value (at WBS Level 3) reporting for the prime contractor and all subcontractors to include labor and materials costs on a weekly basis with no more than a one week latency (e.g., each Friday for the week ending the preceding Friday). Performers will be required to reconcile the informal weekly cost reports with their payment vouchers on a monthly basis.

DARPA anticipates funding Phase 3 with RDT&E Budget Activity 3 ("6.3"), Advanced Technology Development funds which will require pre-publication review of any resultant work product.

II. AWARD INFORMATION

Multiple awards are anticipated. The amount of resources made available under this BAA will depend on the quality of the proposals received and the availability of funds.

DARPA is soliciting proposals for Phases 1a, 1b, and 2. Phases 1b and 2 should be included as priced options to the Phase 1a proposal. Up to three awards, each valued up to $4.0 million are anticipated for Phase 1a; up to two awards, each valued up to $10.4 million are anticipated for Phase 1b; at least one award valued at $26.0 million is

anticipated for Phase 2. The quantity and value of Phase 3 awards will be determined based on the choice of a specific demonstration platform or platforms.

The Government reserves the right to select for negotiation all, some, one, or none of the proposals received in response to this solicitation, and to make awards without discussions with proposers. The Government also reserves the right to conduct discussions if it is later determined to be necessary. If warranted, portions of resulting awards may be segregated into pre-priced options. Additionally, DARPA reserves the right to accept proposals in their entirety or to select only portions of proposals for award. In the event that DARPA desires to award only portions of a proposal, negotiations may be opened with that proposer. If the proposed effort is inherently divisible and nothing is gained from the aggregation, proposers should consider submitting it as multiple independent efforts. The Government reserves the right to fund proposals in phases with options for continued work at the end of one or more of the phases.

Awards under this BAA will be made to proposers on the basis of the evaluation criteria listed below (see section labeled “Application Review Information”, Sec. V.), and program balance to provide overall value to the Government. Proposals identified for negotiation may result in a procurement contract or other transaction depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors. The Government reserves the right to request any additional, necessary documentation once it makes the award instrument determination. Such additional information may include but is not limited to Representations and Certifications. The Government reserves the right to remove proposers from award consideration should the parties fail to reach agreement on award terms, conditions and cost/price within a reasonable time or the proposer fails to timely provide requested additional information.

As of the date of publication of this BAA, DARPA expects that program goals for Phases 1a, 1b, and 2 (but not Phase 3) may be met by proposers intending to perform 'fundamental research,' i.e., basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization the results of which ordinarily are restricted for proprietary or national security reasons. Notwithstanding this statement of expectation, DARPA is not prohibited from considering and selecting research proposals that, while perhaps not qualifying as 'fundamental research' under the foregoing definition, still meet the BAA criteria for submissions. In all cases, the contracting officer shall have sole discretion to select award instrument type and to negotiate all instrument provisions with selectees.

III. ELIGIBILITY INFORMATION

A. Eligible Applicants

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

Universities (HBCUs), Small Businesses, Small Disadvantaged Businesses and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals.

Federally Funded Research and Development Centers (FFRDCs) and Government entities (Government/National laboratories, military educational institutions, etc.) are subject to applicable direct competition limitations and cannot propose to this BAA in any capacity unless they meet the following conditions. FFRDCs must clearly demonstrate that the work is not otherwise available from the private sector AND they also provide a letter on letterhead from their sponsoring organization citing the specific authority establishing their 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 to be prime or subcontractors. Government entities must clearly demonstrate that the work is not otherwise available from the private sector and provide written documentation citing the specific statutory authority (as well as, where relevant, contractual authority) establishing their 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.

Foreign participants and/or individuals may participate to the extent that such participants comply with any necessary Non-Disclosure Agreements, Security Regulations, Export Control Laws, and other governing statutes applicable under the circumstances.

Applicants considering classified submissions (or requiring access to classified information during the life-cycle of the program) shall ensure all industrial, personnel, and information system processing security requirements are in place and at the appropriate level (e.g., Facility Clearance (FCL), Personnel Security Clearance (PCL), certification and accreditation (C&A)) and any Foreign Ownership Control and Influence (FOCI) issues are mitigated prior to such submission or access. Additional information on these subjects can be found at: www.dss.mil.

1. Procurement Integrity, Standards of Conduct, Ethical Considerations, and Organizational Conflicts of Interest

Current federal employees are prohibited from participating in particular matters involving conflicting financial, employment, and representational interests (18 USC 203, 205, and 208.). The DARPA Program Manager for this BAA is Paul Eremenko. Once the proposals have been received, and prior to the start of proposal evaluations, the Government will assess potential conflicts of interest and will promptly notify the proposer if any appear to exist. (Please note the Government assessment does NOT

affect, offset, or mitigate the proposer's own duty to give full notice and planned mitigation for all potential organizational conflicts, as discussed below.)

All proposers and proposed subcontractors must affirm whether they are providing scientific, engineering, and technical assistance (SETA) or similar support to any DARPA technical office(s) through an active contract or subcontract. All affirmations must state which office(s) the proposer supports and identify the prime contract numbers. Affirmations shall be furnished at the time of proposal submission. 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. In accordance with FAR 9.503 and without prior approval or a waiver from the DARPA Director, a contractor cannot simultaneously be a SETA and performer. Proposals that fail to fully disclose potential conflicts of interests and/or do not have plans to mitigate this conflict will be rejected without technical evaluation and withdrawn from further consideration for award.

If a prospective proposer believes that any conflict of interest exists or may exist (whether organizational or otherwise), the proposer should promptly raise the issue with DARPA by sending proposer's contact information and a summary of the potential conflict by email to the mailbox address for this BAA at DARPA-BAA-10-21@darpa.mil, before time and effort are expended in 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, the proposal may be rejected without technical evaluation and withdrawn from further consideration for award under this BAA.

B. Cost Sharing/Matching

Cost sharing is not required for this particular program; however, cost sharing will be carefully considered where there is an applicable statutory condition relating to the selected funding instrument (e.g., for any Other Transactions under the authority of 10 U.S.C. § 2371). Cost sharing is encouraged where there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

IV. APPLICATION AND SUBMISSION INFORMATION

A. Address to Request Application Package

This solicitation contains all information required to submit a proposal. No additional forms, kits, or other materials are needed. This notice constitutes the total BAA. No additional information is available, nor will a formal Request for Proposal (RFP) or additional solicitation regarding this announcement be issued. Requests for same will be disregarded.

B. Content and Form of Application Submission

1. Security and Proprietary Issues

NOTE: If proposals are classified, the proposals must indicate the classification level of not only the proposal itself, but also the anticipated award document classification level.

The Government anticipates proposals submitted under this BAA will be unclassified. However, if a proposal is submitted as "Classified National Security Information" as defined by Executive Order 12958 as amended, then the information must be marked and protected as though classified at the appropriate classification level and then submitted to DARPA for a final classification determination.

Proposers choosing to submit a classified proposal from other classified sources must first receive permission from the respective Original Classification Authority in order to use their information in replying to this BAA. Applicable classification guide(s) should also 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: (e.g., Top Secret, Secret or Confidential)

Classified submissions shall be in accordance with the following guidance:

Confidential and Secret Collateral Information: Use classification and marking guidance provided by previously issued security classification guides, the Information Security Regulation (DoD 5200.1-R), and the National Industrial Security Program Operating Manual (DoD 5220.22-M) when marking and transmitting information previously classified by another Original Classification Authority. Classified information at the Confidential and Secret level may be mailed via appropriate U.S. Postal Service methods (e.g., (USPS) Registered Mail or USPS 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 address to:

Defense Advanced Research Projects Agency
ATTN: Tactical Technology Office
Reference: DARPA-BAA-10-21
3701 North Fairfax Drive
Arlington, VA 22203-1714

The outer envelope shall be sealed with no 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

All Top Secret materials: Top Secret information should be hand carried by an appropriately cleared and authorized courier to the DARPA CDR. Prior to traveling, the courier shall contact the DARPA CDR at 571-218-4842 to coordinate arrival and delivery.

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

Sensitive Compartmented Information (SCI): SCI must be transmitted via approved methods. Prior to transmitting SCI, contact the DARPA Special Security Office (SSO) at 703-248-7213 for instructions.

Proprietary Data: All proposals containing proprietary data should have the cover page and each page containing proprietary data clearly marked as containing proprietary data. It is the Proposer's responsibility to clearly define to the Government what is considered proprietary data.

Security classification guidance via a DD Form 254 will not be provided at this time since DARPA is soliciting ideas only. After reviewing the incoming proposals, if a determination is made that the award instrument may result in access to classified information a DD Form 254 will be issued and attached as part of the award.

Proposers must have existing and in-place prior to execution of an award, approved capabilities (personnel and facilities) to perform research and development at the classification level they propose. It is the policy of DARPA to treat all proposals as competitive information, and to disclose their contents only for the purpose of evaluation. Proposals will not be returned. The original of each proposal received will be retained at DARPA and all other non-required copies destroyed. A certification of destruction may be requested, provided the formal request is received at this office within 5 days after unsuccessful notification.

2. Proposal Format

All proposals must be in the format given below. Nonconforming proposals may be rejected without review. Proposals shall consist of two volumes. All pages shall be printed on 8-1/2 by 11 inch paper with type not smaller than 12 point. Smaller font may

be used for figures, tables and charts. The page limitation for proposals includes all figures, tables, and charts. Volume I, Technical and Management Proposal, may include an attached bibliography of relevant technical papers or research notes (published and unpublished) which document the technical ideas and approach upon which the proposal is based. Copies of not more than five (5) relevant papers can be included with the submission. The bibliography and attached papers are not included in the page counts given below. The submission of other supporting materials along with the proposals is strongly discouraged and will not be considered for review. Except for the attached bibliography, papers, and Section I, Volume I shall not exceed 110 pages. Maximum page lengths for each section are shown in braces { } below. All proposals must be written in English. Both Volumes I and II of the proposal should cover the initial phase of the program as well as the priced option phases. Volume I should also encompass the proposer's general technical approach for Phase 3.

3. Volume I, Technical and Management Proposal

Section I. Administrative {not included in page count}

A. Cover sheet to include:
(1) BAA number (DARPA-BAA-10-21)
(2) Lead Organization Submitting proposal
(3) Type of business, selected among the following categories: "LARGE BUSINESS", "SMALL DISADVANTAGED BUSINESS", "OTHER SMALL BUSINESS", "HBCU", "MI", "OTHER EDUCATIONAL", OR "OTHER NONPROFIT"
(4) Contractor's reference number (if any)
(5) Other team members (if applicable) and type of business for each
(6) Proposal title
(7) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, country, telephone, and electronic mail
(8) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, country, telephone, and electronic mail
(9) total funds requested from DARPA, and the amount of cost share (if any)
(10) Date proposal was submitted

B. Official transmittal letter.

Section II. Summary of Proposal {10 pages}

A. {2} Innovative claims for the proposed research. This section is the centerpiece of the proposal and should succinctly describe the uniqueness and benefits of the proposed approach relative to the current state-of-art alternate approaches.
B. {2} Deliverables associated with the proposed research and the plans and capability to accomplish technology transition and commercialization. Include in this section all proprietary claims to the results, prototypes, intellectual property, or systems supporting and/or necessary for the use of the research, results, and/or

prototype. If there are not proprietary claims, this should be stated. For forms to be completed regarding intellectual property, see Section VIII. There will be no page limit for the listed forms.

C. {3} Cost, schedule, and measurable milestones for the proposed research, including estimates of cost for each task in each year of the effort delineated by the prime and major subcontractors, total cost and company cost share, if applicable. Measurable milestones should capture key development points in tasks and should be clearly articulated and defined in time relative to start of effort. These payable milestones should enable assessment of progress throughout each phase of the effort. Additional interim non-critical management milestones are also highly encouraged at a regular interval (at least monthly).
D. {1} Technical rationale, technical approach, and constructive plan for accomplishment of technical goals in support of innovative claims and deliverable production. (In the full proposal, this section should be supplemented by a more detailed plan in Section III.)
E. {1} General discussion of other research in this area.
F. {1} A clearly defined organization chart for the program team which includes, as applicable: (1) the programmatic relationship of team member; (2) the unique capabilities of team members; (3) the task of responsibilities of team members; (4) the teaming strategy among the team members; and (5) the key personnel along with the amount of effort to be expended by each person during each year.

Section III. Detailed Proposal Information {100 pages}

A. {25} Statement of Work (SOW) - In plain English, clearly define the technical tasks/subtasks to be performed, their durations, and dependencies among them for Phases 1a, 1b, and 2. The SOW must not include proprietary information. For each task/subtask, provide:
    a. A general description of the objective (for each defined task/activity);
    b. A detailed description of the approach to be taken to accomplish each defined task/activity);
    c. Identification of the primary organization responsible for task execution (prime, sub, team member, by name, etc.);
    d. The exit criteria for each task/activity - a product, event or milestone that defines its completion;
    e. Define all deliverables (reporting, data, reports, software, etc.) to be provided to the Government in support of the proposed research tasks/activities.
    f. The SOW should be developed so that each phase of the program is separately defined.
    g. Do not include any proprietary information in the SOW.
B. {15} An Integrated Master Schedule (IMS) at WBS Level 3 that provides a detailed, integrated schedule of all activities by program phase, including risk reduction tasks. All tasks in the IMS shall be linked and the ability to display the critical path shall be implemented.

C. {15} Cost summary by each task at WBS Level 2 including estimates of cost for each task in each year of the effort delineated by the prime and major subcontractors, total cost and company cost share, if applicable.
D. {20} Detailed technical rationale and approach enhancing that of Section II, including comparison with other ongoing research indicating advantages and disadvantages of the proposed effort. In addition to the technical approach for the priced phases (i.e., Phases 1a, 1b, and 2) this should include the general technical approach envisioned for Phase 3.
E. {5} Critical technical and non-technical risks for each phase of the program and the proposed approach for handling or mitigating those risks.
F. {5} Results and deliverables in each phase of the program and transition plans, interim off-ramps. Include in this section all proprietary claims to the results, prototypes, intellectual property, or systems supporting and/or necessary for the use of the research, results, and/or prototype. If there are not proprietary claims, this should be stated. Describe the proposed approach to intellectual property rights, together with supporting rationale of how this approach meets the Government's objectives and why this approach offers the best value to the Government. For forms to be completed regarding intellectual property, see Section VIII. There will be no page limit for the listed forms.
G. {3} Discussion of proposer's and team's previous accomplishments and work in closely related research areas.
H. {2} Description of the unique facilities and equipment that would be used for the proposed effort.
I. {10} Description of the proposer's team structure, including formal teaming agreements which are required to execute this program and their status, the responsibilities of corporate and project team members, the approach to managing the team and ensuring alignment of incentives, identification of key personnel including short resumes (to include education, experience, and principal accomplishments) for each. This should include a discussion of Phase 3 execution.

Section IV. Additional Information

A brief bibliography of relevant technical papers and research notes (published and unpublished) which document the technical ideas upon which the proposal is based. Copies of not more than five (5) relevant papers can be included in the submission.

4. Volume II, Cost Proposal – {No Page Limit}

Cover sheet to include:

(1) BAA number;
(2) Technical area;
(3) Lead Organization Submitting proposal;
(4) Type of business, selected among the following categories: "LARGE BUSINESS", "SMALL DISADVANTAGED BUSINESS", "OTHER SMALL

BUSINESS", "HBCU", "MI", "OTHER EDUCATIONAL", OR "OTHER NONPROFIT";

(5) Contractor's reference number (if any);
(6) Other team members (if applicable) and type of business for each;
(7) Proposal title;
(8) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, country, telephone, and electronic mail;
(9) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, country, telephone, and electronic mail;
(10) Award instrument requested: cost-plus-fixed-free (CPFF), cost-contract—no fee, cost sharing contract – no fee, or other type of procurement contract (*specify*), grant, cooperative agreement, or other transaction;
(11) Place(s) and period(s) of performance;
(12) Total proposed cost separated by basic award and option(s) (if any);
(13) Name, address, and telephone number of the proposer's cognizant Defense Contract Management Agency (DCMA) administration office (*if known)*;
(14) Name, address, and telephone number of the proposer's cognizant Defense Contract Audit Agency (DCAA) audit office (*if known*);
(15) Date proposal was prepared;
(16) DUNS number;
(17) TIN number; and
(18) Cage Code;
(19) Subcontractor Information; and
(20) Proposal validity period.

The Government requests and recommends that tables included in the cost proposal also be provided in MS Excel™ format with calculations formulae intact to allow traceability of the cost proposal numbers across the prime and subcontractors. If the PDF submission differs from the Excel submission, the PDF will take precedence. Each copy must be clearly labeled with the DARPA BAA number, proposer organization, and proposal title (short title recommended).

The Government also requests and recommends that the Cost Proposal include MS Excel file(s) that provide traceability between the Bases of Estimate (BOEs) and the proposed costs across all elements and phases. This includes the calculations and adjustments that are utilized to generate the Summary Costs from the source labor hours, labor costs, material costs, etc. input data. It is requested that the costs and Subcontractor proposals be readily traceable to the Prime Cost Proposal in the provided MS Excel file(s). The Government prefers receiving cost data as Excel files; however, this is not a requirement.

Detailed cost breakdown to include: (1) total program cost broken down by major cost items (direct labor, including labor categories; subcontracts; materials; other direct costs, overhead charges, etc.) and further broken down by task and phase; (2) major program tasks by fiscal year; (3) an itemization of major subcontracts and equipment purchases; (4) an itemization of any information technology (IT) purchase[11]; (5) a summary of

[11] IT is defined as "any equipment, or interconnected system(s) or subsystem(s) of equipment that is used

projected funding requirements by month; and (6) the source, nature, and amount of any industry cost-sharing; and (7) identification of pricing assumptions of which may require incorporation into the resulting award instrument (e.g., use of Government Furnished Property/Facilities/Information, access to Government Subject Matter Expert/s, etc.). The prime contractor is responsible for compiling and providing all subcontractor proposals for the Procuring Contracting Officer (PCO). Subcontractor proposals should include Interdivisional Work Transfer Agreements (ITWA) or similar arrangements. Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates for each. NOTE: for IT and equipment purchases, include a letter stating why the proposer cannot provide the requested resources from its own funding.

Supporting cost and pricing information in sufficient detail to substantiate the summary cost estimates in B. above. Include a description of the method used to estimate costs and supporting documentation. Note: "cost or pricing data" as defined in FAR Subpart 15.4 shall be required if the proposer is seeking a procurement contract award of $650,000 or greater unless the proposer requests an exception from the requirement to submit cost or pricing data. "Cost or pricing data" are not required if the proposer proposes an award instrument other than a procurement contract (e.g., a grant, cooperative agreement, or other transaction.) All proprietary subcontractor proposal documentation, prepared at the same level of detail as that required of the prime (add if submitted through T-FIMS: of which cannot be uploaded to T-FIMS) shall be provided to the Government either by the prime contractor or by the subcontractor organization when the proposal is submitted. Subcontractor proposals submitted to the Government by the prime contractor should be submitted in a sealed envelope that the prime contractor will not be allowed to view. The subcontractor must provide the same number of hard copies and/or electronic proposals as is required of the prime contractor.

NOTE: PROPOSERS ARE CAUTIONED THAT EVALUATION RATINGS MAY BE LOWERED AND/OR PROPOSALS REJECTED IF SUBMITTAL INSTRUCTIONS ARE NOT FOLLOWED.

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in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the agency. (a) For purposes of this definition, equipment is used by an agency if the equipment is used by the agency directly or is used by a contractor under a contract with the agency which – (1) Requires the use of such equipment; or (2) Requires the use, to a significant extent, or such equipment in the performance of a service or the furnishing of a product. (b) The term "information technology" includes computers, ancillary, software, firmware and similar procedures, services (including support services), and related resources. (c) The term "information technology" does not include – (1) Any equipment that is acquired by a contractor incidental to a contract; or (2) Any equipment that contains imbedded information technology that is used as an integral part of the product, but the principal function of which is not the acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. For example, HVAC (heating, ventilation, and air conditioning) equipment such as thermostats or temperature control devices, and medical equipment where information technology is integral to its operation, are not information technology."

For information on 845 Other Transaction Authority for Prototypes (OTA) agreements, refer to http://www.darpa.mil/cmo/other_trans.html. All proposers requesting an 845 Other Transaction Authority for Prototypes (OTA) agreement must include a detailed list of milestones. Each such milestone must include the following: milestone description, completion criteria, due date, payment/funding schedule (to include, if cost share is proposed, contractor and Government share amounts). It is noted that, at a minimum, such milestones should relate directly to accomplishment of program technical metrics as defined in the BAA and/or the proposer's proposal. Agreement type, fixed price or expenditure based, will be subject to negotiation by the Agreements Officer; however, it is noted that the Government prefers use of fixed price milestones with a payment/funding schedule to the maximum extent possible. Do not include proprietary data. If the proposer requests award of an 845 OTA agreement as a nontraditional defense contractor, as so defined in the OSD guide entitled "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. Additionally, if the proposer plans requests award of an 845 OTA agreement, without the required one-third (1/3) cost share, information must be included in the cost proposal supporting that there is at least one non-traditional defense contractor participating to a significant extent in the proposed prototype project.

C. Submission Dates and Times

1. Proposal Submission Date

The full proposal (original, ten (10) hard copies, and two (2) CDs with an electronic copy in Microsoft Office or Adobe PDF formats) must be submitted to DARPA/TTO, 3701 North Fairfax Drive, Arlington, VA 22203-1714 (Attn: DARPA-BAA-10-21) on or before 4:00pm, local time, February 18, 2010, in order to be considered during the initial round of selections; however, proposals received after this deadline may be received and evaluated up to 180 days from date of posting on FedBizOpps. Full proposals submitted after the due date specified in the BAA may be selected contingent upon the availability of funds.

DARPA will post a consolidated Question and Answer response after January 8, 2010, before final full proposals are due. In order to receive a response to your question, submit your question by January 5, 2010 to DARPA-BAA-10-21@darpa.mil.

DARPA will acknowledge receipt of complete submissions via email and assign control numbers that should be used in all further correspondence regarding proposals.

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

D. Intergovernmental Review (if applicable)

Not Applicable.

E. Funding Restrictions

Not Applicable.

V. APPLICATION REVIEW INFORMATION

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) Proposer's Capabilities and Related Experience; (d) Cost Realism; (e) Plans and Capability to Accomplish Technology Transition. Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons. The following are descriptions of the evaluation criteria:

(a) 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 provided are complete and in a logical sequence with all proposed deliverables clearly defined such that a final outcome that achieves the goal can be expected as a result of award. The proposal identifies major technical risks and planned mitigation efforts are clearly defined and feasible.

(b) 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. The submission is suitably structured to produce a DARPA program or product.

(c) Proposer's Capabilities and Related Experience

The proposer's capabilities and experience are relevant and applicable to each principal technical activity in each program phase. The proposer's prior experience in technically similar efforts must clearly demonstrate expertise in the appropriate technology areas. The proposed team has the expertise to manage the cost and schedule.

(d) Cost Realism

The objective of this criterion is to establish that the proposed costs are realistic for the technical and management approach offered, as well as 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 Statement of Work). At a minimum, this will involve review, at the prime and subcontract level, of the type and number of labor hours proposed per task as well as the types and kinds of materials, equipment and fabrication costs proposed. It is expected that the effort will leverage all available relevant prior research in order to obtain the maximum benefit from the available funding. 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 in order to be in a more competitive posture. DARPA discourages such cost strategies.

(e) Plans and Capability to Accomplish Technology Transition

The capability to transition the technology to the research, industrial, and operational military communities in such a way as to enhance U.S. defense, and the extent to which intellectual property rights limitations create a barrier to technology transition.

B. Review and Recommendation Process

Award(s) will be made to proposers whose proposals are determined to be the most advantageous to the Government, all factors considered, including the potential contributions of the proposed work to the overall research program and the availability of funding for the effort. Award(s) may be made to any proposer(s) whose proposal(s) is determined selectable regardless of its overall rating. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons.

It is the policy of DARPA to ensure impartial, equitable, comprehensive proposal evaluations and to select the source (or sources) whose offer meets the Government's technical, policy, and programmatic goals. Pursuant to FAR 35.016, the primary basis for selecting proposals for acceptance shall be technical, importance to agency programs, and fund availability. In order to provide the desired evaluation, qualified Government personnel will conduct reviews and (if necessary) convene panels of experts in the appropriate areas.

Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. For evaluation purposes, a proposal is the document described in "Proposal Information," Section IV.B.. Other supporting or background materials submitted with the proposal will be considered for the reviewer's convenience only and not considered as part of the proposal.

Restrictive notices notwithstanding, proposals may be handled for administrative purposes by support contractors. These support contractors are prohibited from competition in DARPA technical research and are bound by appropriate non-disclosure requirements.

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 the appropriate non-disclosure requirements.

VI. AWARD ADMINISTRATION INFORMATION

A. Award Notices

As soon as the evaluation of a proposal is complete, the proposer will be notified that 1) the proposal has been selected for funding pending contract negotiations, or 2) the proposal has not been selected. These official notifications will be sent via electronic mail to the Technical POC identified on the proposal coversheet.

B. Administrative and National Policy Requirements

1. Meeting and Travel Requirements

There will be a program kickoff meeting and all key participants are required to attend. Performers should also anticipate regular program-wide PI Meetings and periodic site visits at the Program Manager's discretion.

2. Human Use

All research involving human subjects, to include use of human biological specimens and human data, selected for funding must comply with the 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.dtic.mil/biosys/downloads/32cfr219.pdf), 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/html2/d32162x.htm).

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 also have a valid Assurance. In addition, personnel involved in human subjects research must provide documentation of completing appropriate training for the protection of human subjects.

For all proposed research that will involve human subjects in the first year or phase of the project, the institution must provide evidence of or a plan for review by an Institutional Review Board (IRB) upon final proposal submission to DARPA. The IRB conducting the review must be the IRB identified on the institution's Assurance. 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. Consult the designated IRB for guidance on writing the protocol. The informed consent document must comply with federal regulations (32 CFR 219.116). A valid Assurance along with evidence of appropriate training 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 the 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. Note that confirmation of a current Assurance and appropriate human subjects protection training is required before headquarters-level approval can be issued.

The amount of time required to complete the IRB review/approval process may 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 one to three months, followed by a DoD review that could last between three to six months. No DoD/DARPA funding can be used towards human subjects research until ALL approvals are granted.

3. Animal Use

Any Recipient performing research, experimentation, or testing involving the use of animals shall comply with the rules on animal acquisition, transport, care, handling, and use in: (i) 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); (ii) the guidelines described in National Institutes of Health Publication No. 86-23, "Guide for the Care and Use of Laboratory Animals"; (iii) DoD Directive 3216.01, "Use of Laboratory Animals in DoD Program."

For submissions containing 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 PHS Policy on Humane Care and Use of Laboratory Animals, available at http://grants.nih.gov/grants/olaw/olaw.htm.

All Recipients must receive approval by a DoD certified veterinarian, in addition to an IACUC approval. No animal studies may be conducted using DoD/DARPA funding until the USAMRMC 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, which may be found at https://mrmc.amedd.army.mil/AnimalAppendix.asp

4. Publication Approval

It is the policy of the Department of Defense that the publication of products of fundamental research will remain unrestricted to the maximum extent possible. The definition of Contracted Fundamental Research is:

> "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 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 the performance of research resulting from this BAA (i.e., program Phases 1a, 1b, and 2) will be fundamental research.

For certain research projects, it may be possible that although the research being performed by the Prime Contractor is Restricted Research, a subcontractor may be conducting Contracted Fundamental Research. In those cases, it is the Prime Contractor's responsibility to explain in their proposal why its subcontractor's effort is Contracted Fundamental Research.

The following same or similar provision will be incorporated into any resultant Restricted Research or Non-Fundamental 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 Technical Information Officer (DARPA/TIO). 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 dated October 6, 1987.

When submitting material for written approval for open publication, the Contractor/Awardee must submit a request for public release to the DARPA TIO and include the following information: 1) Document Information: document title, document author, short plain-language description of technology discussed in the material (approx. 30 words), number of pages (or minutes of video) and document type (briefing, report, abstract, article, or paper); 2) Event Information: event type (conference, principle investigator meeting, article or paper), event date, 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, e-mail and phone. Allow four weeks for processing; due dates under four weeks require a justification. Unusual electronic file formats may require additional processing time. Requests can be sent either via e-mail to tio@darpa.mil or via 3701 North Fairfax Drive, Arlington VA 22203-1714, telephone (571) 218-4235. Refer to www.darpa.mil/tio for information about DARPA's public release process.

5. Export Control

Should this project develop beyond fundamental research (basic and applied research ordinarily published and shared broadly within the scientific community) with military or dual-use applications the following apply:

(1) The Contractor shall comply with all U. S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120 through 130, and the Export Administration Regulations (EAR), 15 CFR Parts 730 through 799, in the performance of this contract. In the absence of available license exemptions/exceptions, the Contractor shall be responsible for obtaining the appropriate licenses or other approvals, if required, for exports of (including deemed exports) hardware, technical data, and software, or for the provision of technical assistance.

(2) The Contractor shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of this contract, including instances where the work is to be performed on-site at any Government installation (whether in or outside the United States), where the foreign person will have access to export-controlled technologies, including technical data or software.

(3) The Contractor shall be responsible for all regulatory record keeping requirements associated with the use of licenses and license exemptions/exceptions.

(4) The Contractor shall be responsible for ensuring that the provisions of this clause apply to its subcontractors**.**

6. Subcontracting

Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. 637(d)), it is the policy of the Government to enable small business 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 assure that prime contractors and subcontractors carry out this policy. Each proposer who submits a contract proposal and includes subcontractors is required to submit a subcontracting plan in accordance with FAR 19.702(a) (1) and (2) should do so with their proposal. The plan format is outlined in FAR 19.704.

7. Electronic and Information Technology

In compliance with Section 508 of the Rehabilitation Act (29 U.S.C. 794d) and FAR Subpart 39.2, if it is anticipated that this BAA will be used to procure electronic or information (EIT) technology, and the exceptions listed in FAR Subpart 39.204 do not apply, the following language must be included in the BAA:

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 proposer who submits a proposal 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

As per FAR 22.1802, recipients of FAR-based procurement contracts must enroll as Federal Contractors in E-verify and use E-Verify to verify employment eligibility of all employees assigned to the award. All resultant contracts from this solicitation will include FAR 52.222-54, “Employment Eligibility Verification.” This clause will not be included in grants, cooperative agreements, or Other Transactions.

C. Reporting

The number and types of reports will be specified in the award document, but will include as a minimum monthly (in Phases 1a and 1b) or weekly (in Phases 2 and 3) technical and financial status reports. The reports shall be prepared and submitted in accordance with the procedures contained in the award document and mutually agreed on before award. At least one copy of each report will be delivered to DARPA and not merely placed on a web/share point site. Reports and briefing material will also be

required as appropriate to document progress in accomplishing program metrics. A Final Report that summarizes the project and tasks will be required at the conclusion of the performance period for the award, notwithstanding the fact that the research may be continued under a follow-on vehicle.

D. Electronic Systems

1. Central Contractor Registration (CCR)

Selected proposers not already registered in the Central Contractor Registry (CCR) will be required to register in CCR prior to any award under this BAA. Information on CCR registration is available at http://www.ccr.gov.

2. Representations and Certifications

In accordance with FAR 4.1201, prospective proposers shall complete electronic annual representations and certifications at http://orca.bpn.gov.

3. Wide Area Work Flow (WAWF)

Unless using another approved electronic invoicing system, performers will be required to submit invoices for payment directly via the Internet/WAWF at http://wawf.eb.mil. Registration to WAWF will be required prior to any award under this BAA.

4. i-Edison

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

VII. AGENCY CONTACTS

Administrative, technical or contractual questions should be sent via e-mail to DARPA-BAA-10-21@darpa.mil. All requests must include the name, title, organization, email address, and phone number of a point of contact. The cognizant officials for this BAA are:

Christopher Glista
Contracting Officer
DARPA/CMO

Paul Eremenko
Program Manager
DARPA/TTO

VIII. OTHER INFORMATION

A. Intellectual Property

1. Procurement Contract Proposers

a. Noncommercial 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 noncommercial technical data and noncommercial 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. In the event that proposers do not submit the list, the Government will assume that it automatically has "unlimited rights" to all noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, unless it is substantiated that development of the noncommercial technical data and noncommercial computer software occurred with mixed funding. If mixed funding is anticipated in the development of noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, then 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. Proposers are admonished that 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, then the proposer should state "NONE."

A sample list for complying with this request is as follows:

NONCOMMERCIAL			
Technical Data Computer Software To be Furnished With Restrictions	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(LIST)	(LIST)	(LIST)

b. 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 embedded in any noncommercial deliverables contemplated under the research effort, along with any applicable restrictions on the Government's use of such commercial technical data and/or commercial computer software. In the event that proposers do not submit the list, the Government will assume that 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, as may be necessary, to evaluate the proposer's assertions. If no restrictions are intended, then the proposer should state "NONE."

A sample list for complying with this request is as follows:

COMMERCIAL			
Technical Data Computer Software To be Furnished With Restrictions	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(LIST)	(LIST)	(LIST)

B. Non-Procurement Contract Proposers – Noncommercial and Commercial Items (Technical Data and Computer Software)

Proposers responding to this BAA requesting a Grant, Cooperative Agreement, Technology Investment Agreement, or Other Transaction for Prototype 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. Although not required, proposers may use a format similar to that described in Paragraphs 1.a and 1.b above. 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, as may be necessary, to evaluate the proposer's assertions. If no restrictions are intended, then the proposer should state "NONE."

C. All Proposers – Patents

Include documentation proving your ownership of or possession of appropriate licensing rights to all patented inventions (or inventions for which a patent application has been filed) that will be utilized under your proposal for the DARPA program. If a patent application has been filed for an invention that your proposal utilizes, but the application has not yet been made publicly available and contains proprietary information, you may provide only the patent number, inventor name(s), assignee names (if any), filing date, filing date of any related provisional application, and a summary of the patent title,

together with either: 1) a representation that you own the invention, or 2) proof of possession of appropriate licensing rights in the invention.

1. All Proposers – Intellectual Property Representations

Provide a good faith representation that you either own or possess appropriate licensing rights to all other intellectual property that will be utilized under your proposal for the DARPA program. Additionally, 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.

D. Desired Rights in Software and Technical Data

Proposers are further advised that DARPA desires that all software and technical data developed under the contract for Phases 1a and 1b be delivered with Unlimited Rights, and all software and technical data developed under the contract for Phase 2 to be delivered with no less than Government Purpose Rights, so that the technology may be shared with the research, industrial, and operational military communities to enhance national defense. However, if the proposer believes that software to be delivered under this contract can be provided with other types of rights and still satisfy the Government requirements, the proposer may provide this information in its proposal, and the Government will consider this information during the evaluation. A more favorable evaluation will be given to those proposals that do not contain any limitations on the transition of intellectual property. If the proposer proposes to use software developed exclusively at private expense to satisfy the Government requirements, the government may be willing to purchase appropriate use rights to satisfy the Government requirements. To address this possibility, the proposer should include the appropriate cost for this use in its cost proposal.