Architecture-Aware Compiler Environment (AACE)
Broad Agency Announcement (BAA) 08-30

for

Information Processing Techniques Office (IPTO)
Defense Advanced Research Projects Agency (DARPA)

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Part One: Overview Information

- **Federal Agency Name –** Defense Advanced Research Projects Agency (DARPA), Information Processing Techniques Office (IPTO)
- **Funding Opportunity Title** – Architecture-Aware Compiler Environment (AACE)
- **Announcement Type –** Initial Broad Agency Announcement (BAA)
- **Funding Opportunity Number –** BAA 08-30
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – 12.910 Research and Technology Development
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    - Final Closing (BAA expiration) – 12:00 PM (ET), 17 Apr 2009
- **Anticipated individual awards** – Multiple awards are anticipated.
- **Types of Instruments That May Be Awarded** – Procurement contract, grant, cooperative agreement or other transaction.
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Part Two: Full Text of Announcement

The Defense Advanced Research Projects Agency (DARPA) 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.

I. Funding Opportunity Description

BACKGROUND AND PROGRAM GOALS

The increasing complexity of modern computing systems makes it difficult to achieve even a reasonable fraction of a system's available performance. As system complexity continues to escalate, this problem creates an increasingly serious bottleneck which inhibits the ability of programmers to achieve the performance necessary for applications critical to our national security.

System builders currently employ a variety of techniques to boost peak system performance including multicore architectures, heterogeneous systems, and accelerators built from nontraditional processing elements e.g. graphics processing unit (GPU) and field programmable gate array (FPGA) devices. Unfortunately, the level of sophistication and expertise required to develop and tune a program is growing with the complexity of the underlying systems, a fact that holds true from embedded controllers through all aspects of petascale or exascale computing systems.

Over the past twenty years, compiler-based tools have become the principal moderators of performance. Compilers, and their associated tools, have the primary responsibility for mapping an application onto the underlying hardware. It is typical for a user to provide substantial assistance in this process through source-level directives, direct specification of low-level application programming interfaces (APIs), and many other mechanisms. In the end, however, the application's implementation is bounded by the performance that the compiler is able to expose.

The necessary technologies now exist to drive significant advances in compiler-delivered performance across a broad range of target systems. These technologies can solve the challenges inherent in the design and development of complex systems. It will require a coordinated program of research and development that focuses not only on breakthrough ideas to solve the major problems and current limitations, but also the investigation, development and integration of all the components so that they work together to create the desired development environment and program preparation tools.

The goal of DARPA's envisioned Architecture-Aware Compiler Environment (AACE) Program is to develop computationally efficient compilers that incorporate learning and reasoning methods to drive compiler optimizations for a broad spectrum of computing system configurations. System solutions will include dynamic runtime optimizations for

minimizing the execution time across a broad spectrum of application codes. This will entail development of a new type of compiler technology for current and future computer systems that will learn the characterization of a broad spectrum of complex computing systems, and learn optimized compilation of diverse applications that achieve the full performance potential of the computing systems while minimizing code development and execution time. This new compiler technology will need to draw on reasoning techniques to take advantage of system characterizations and compiler optimizations already learned.

Current production-quality compilers are typically based on single-core, single-chip legacy compilers that have been under development for more than ten years. The result is that compilers have become large monolithic software packages. For example, the Open64 compiler, which is an open source compiler based on the SGI MIPSPro compiler, has over 2,000,000 lines of source code. Making significant improvements to these compilers is a major development effort. Optimized production compilers are typically released several years after the initial release of the computer systems. As a consequence, the optimized compiler is frequently released around the time that its targeted computer is eclipsed by the next generation computer platform. Unfortunately, application developers are forced to use the preliminary development environment, which is based on the initial compiler that is shipped with the computer system. This fact is becoming a major problem for DOD application developers – it either prevents users from achieving the full processing potential of the system, or requires extensive expertise, labor, development time, and cost to obtain optimized performance from the computing resources. As DOD applications and computing systems increase in complexity, these issues will increasingly limit the capabilities available to the warfighter.

To reduce the burden on programmers and to make more effective use of the underlying hardware, a completely new approach to compilers is required to resolve these formidable problems. Application software is rapidly becoming one of the DOD's costliest and error-prone areas. The envisioned Architecture-Aware Compiler Environment (AACE) Program has the potential to dramatically reduce application development costs and labor; ensure that executable code is optimal, correct, and timely; provide the full capabilities of computing system advances to our warfighters; and provide superior design and performance capabilities across a broad range of applications.

PROGRAM OVERVIEW

The DARPA AACE Program is seeking to develop productive, computationally efficient compilers and runtime systems for a broad spectrum of system configurations and applicable to a broad spectrum of DOD relevant applications.

Compilers should be constructed based on a modular design, where the actual modules are selected and optimized based on the architectural characterization of a particular computing system. The overall process should result in an automatically self-assembling, optimized compiler that doesn't require user involvement or expertise.

Offerors will need to develop a new generation of programming models and sophisticated tools to support the compiler environment. Since systems often have lifetimes that are shorter than historical tool development cycles, the tools must be reusable, description driven, and capable of adapting their behavior to new systems with new design parameters i.e., easily retargeted to new processors, and system configurations. The tools must assist in program development and automate, utilizing cognitive methods, as much of the application tuning process as possible. The same set of tools should be usable from a laptop to a petascale computer and to a heterogeneous embedded system.

Dynamic compiler runtime optimization is a key approach to significantly improving and tuning the performance of an application. Mechanisms for compiler optimization, based on performance data feedback to the compiler for application codes, need to be developed. An architecture aware compiler should then be able to significantly reduce the number of feedback loops required to achieve major performance improvements. Even more importantly, the compiler environment should learn each class of optimization and maintain a knowledge base of these classes so that, where possible, the full runtime optimization process does not have to be repeated from scratch for every application. Since application programmers must develop codes for embedded systems, emerging multicore processors, and future exascale systems, programming any of these system classes must be made more tractable. It is imperative that we develop flexible compiler technology that can learn to efficiently and effectively map a high-level source program to a range of target platforms. The successful compiler will discover and package multiple levels of parallelism, tailor the granularities of that parallelism to manage the overheads on the specific target system, and avoid both serialization and redundant work. The primary difference between these target classes will be the overheads that must be managed and the objective functions for evaluating the quality of particular code generation alternatives.

Compiler designs must be applicable across a broad range of processing architectures. These architectures may consist of either a single multi-core processor or very large multi-processor systems. Memory may be either shared or distributed, and processors may be homogenous or heterogeneous. Application software will range across several DOD domains. Example application domains of significant interest are: signal processing, turbulent flow models, shock physics, ocean and circulation models.

The compilers developed under the AACE Program should support one or more of the standard languages, such as C and/or FORTRAN, with MPI or OpenMP. Compilers that support the Partitioned Global Address Space (PGAS) Languages are also encouraged. AACE designs could include extensions or limitations to an existing language that provide better methods for expressing the parallelism exhibited by an application.

A high-level representation (example) of a possible self-assembling compiler is shown below in Figure 1. The characterization program would learn how to represent a system and produce a data file containing compiler-specific information needed to deal with any

target processing system. The data would be comprised of elements representing base system components and capabilities. This characterization data, together with a Configuration File, would drive the Compiler Environment. It is anticipated that reasoning mechanisms, particularly analogy-based reasoning, could play a significant role in correlating system characteristics with compiler optimizations for each specific application.

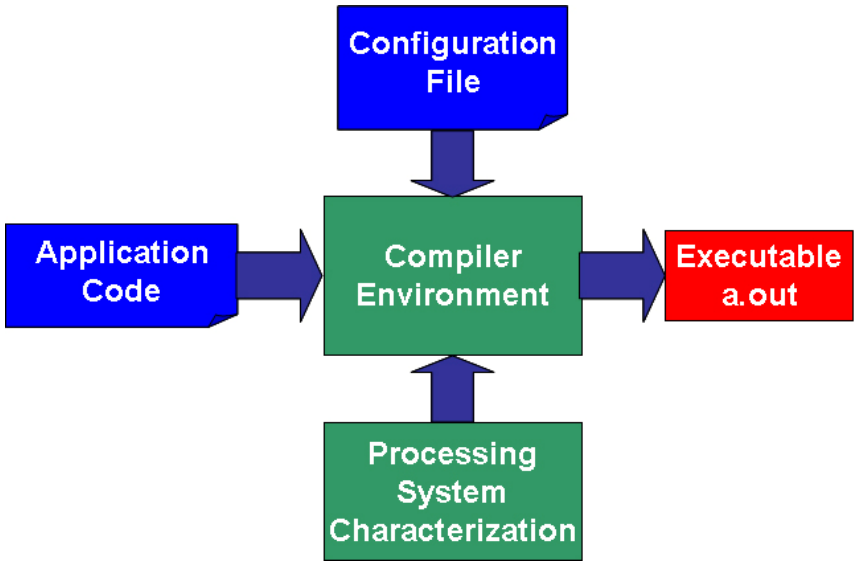

Figure 1: Overview Example of an Architecture-Aware Compiler Environment (AACE).

While Figure 1 illustrates an approach that would develop a possible separate "System Characterization Program" that generates the Processing System Characterization file, another approach is to design a self-assembling compiler that learns to generate the characterization data that would be used to assemble the optimizations used by the compiler. All approaches that meet the AACE Program goals as described in this BAA will be considered.

Increased complexity in the computer system will be reflected in increased complexity in the runtime system (see Figure 2). The selection of compiler optimizations based on statically scheduled parallel computations on large-scale machines is a serious runtime performance problem. Thus, the runtime system will need to learn to dynamically adapt behaviors planned at compile time to the actual performance during runtime. The capabilities should include process migration and dynamic scheduling to handle the operational vagaries of complex applications implemented on large-scale parallel machines. Equally important, runtime reoptimization presents an opportunity to improve application performance significantly. Runtime reoptimizers use lightweight mechanisms to gather information and apply that knowledge to reorganize and rewrite the running code. Specific improvement comes from learning how to tailor and optimizing the code to actual execution patterns and to values and information known only at runtime.

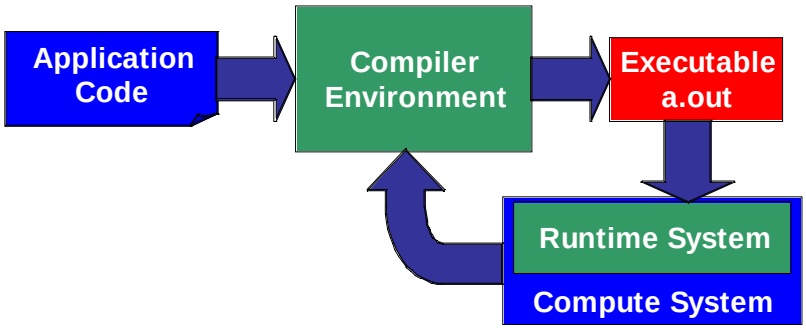

Figure 2: Example Compiler Environment with an Optimizing Runtime System

The runtime system will collect performance data in a knowledge database that can be reused by other applications that are executed on the system. Another feature of the runtime system could be to provide feedback to the compiler to be used to improve the self-assembly process.

The AACE Program will be comprised of two types of teams. The first type is the AACE Development Team, which will be responsible for the development of complete Architecture Aware Compiler Environments. There may be several AACE Development Teams. The second type of team is the AACE Metrics and Evaluation Team, which will be responsible for developing full metrics, as specified by DARPA, for evaluating the environments produced by the AACE Development Team(s). This will include implementing representative benchmark applications that will be used to test the results of the AACE Development Teams. The Metrics and Evaluation Team will be responsible for the testing and evaluation of AACE system performance against these metrics and applications. There will be only one AACE Metrics and Evaluation Team.

The AACE Program performers must deliver two key software components: 1) a compiler that automatically selects the appropriate optimizations based on a learned characterization of the target system; and 2) a dynamic runtime environment that can dynamically improve the performance of a program during runtime and/or provide information that can be used by the compiler to optimize for future runs of the program. Taken together, these two components, along with knowledge bases generated by the characterization and runtimes processes, and any supporting language and tools, comprise the complete Architecture Aware Compiler Environment (AACE) that is the goal of the program. **Performers must commit to either commercialization of the AACE developed under this effort or providing the environment and the technologies as open source** Offerors should pay particular attention to the Intellectual Property information outlined in Section VI.3 below.

Since the development of AACE is a highly complex endeavor, an Independent Compiler Evaluation Panel will conduct preliminary and final design reviews during the program. The panel will be selected by DARPA through a process independent of this BAA, and will consist of community-recognized compiler experts. DARPA will ensure that the members of the panel do not have any conflicts of interest that would prevent

them from providing a fair and balanced evaluation of the AACE designs. DARPA will make the final decision concerning the quality of the AACE designs. This panel is separate from the Metrics and Evaluation Team.

PROGRAM STRUCTURE

The envisioned AACE Program consists of three phases. In Phase I, the focus will be on the preliminary design and development of a prototype compiler that can be used to demonstrate the processing system characterization feature. In Phase II, the development teams will complete the design and a prototype of AACE that includes all of the major features. Finally, in Phase III the development teams will provide a complete AACE.

This BAA seeks proposals for two tasks which are described in detail in the next section.

Task 1: Development of AACE: The team(s) selected for this task will be responsible for the development of complete Architecture Aware Compiler Environments, including all documentation.

Task 2: Metrics & Evaluation of AACE: This team will be responsible for developing full metrics defined by DARPA for evaluating environments produced in Task 1. This will include implementing representative applications used in test events. This team will be responsible for the actual test and evaluation of AACE system performance against these metrics and applications.

As discussed above, each task will include three phases. Proposals must address all three phases. If more than one team successfully meets all milestones, those teams will participate in a final “bake-off” performance evaluation. Development phasing between key AACE components and the final bake-off is outlined in Figure 3 below.

Proposals may be submitted for either or both of the two tasks described above. However, each task must be submitted as a separate proposal, and offerors will be awarded at most one of the two tasks. The performer selected for the Task 2 Metrics and Evaluation effort, will not and cannot be selected for the Task 1 Development effort, whether as a prime or subcontractor or in any other capacity; therefore, if DARPA selects your proposal for Task 2, your proposal submitted for Task 1 will be considered as “not selectable” even if it would otherwise have been considered “selectable” according to the evaluation criteria. This is to avoid organizational conflict-of interest situations between technical and evaluation efforts and to ensure objective test and evaluation results. The Government reserves the right to choose which task proposal to select and which not to select, in cases where an offeror has submitted otherwise selectable proposals to both tasks. All program phases are dependent on available funds and other program considerations.

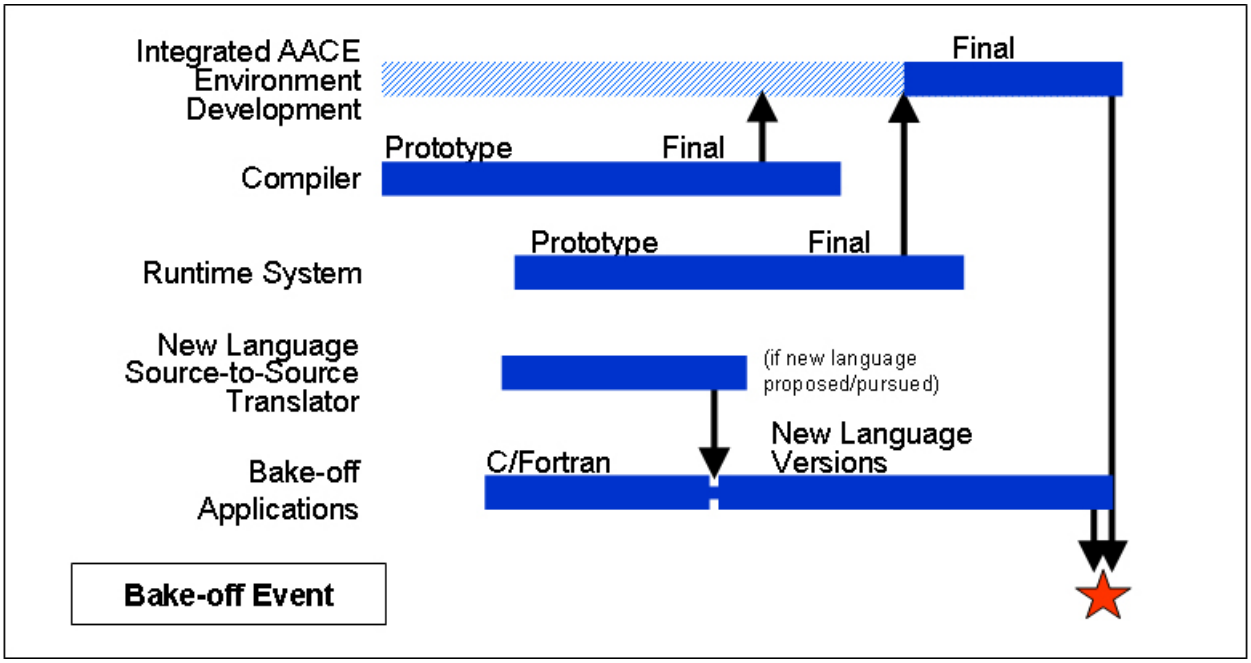

Figure 3: Overview of AACE Program Task 1 Workflow.

DETAILED TASK DESCRIPTIONS

Task 1. Development of the Architecture-Aware Compiler Environment (AACE)

DARPA seeks compiler environments that provide efficient utilization of computing resources, without requiring the application developer to have prior detailed knowledge of the target computing system or the compiler itself. Approaches must be applicable across a broad range of processing architectures. These architectures may consist of either a single multi-core processor or very large multi-processor systems. Memory may be either shared or distributed, and processors may be homogenous or heterogeneous. Application software will range across several DOD domains.

The evaluation of proposals submitted under Task 1 will place a very heavy weight on the innovativeness of the proposed technical solution. Proposals that merely represent the simple integration of existing compiler technologies will be considered non-responsive to the BAA and rejected by the DARPA Program Manager.

A high-level representation of one possible self-assembling compiler is shown in Figure 1 above. In this example, the characterization program would produce a data file containing compiler-specific information needed to deal with any target processing system. The data would be comprised of elements representing base system components and capabilities. This characterization data, together with a Configuration File, would drive the Compiler Environment.

Figure 1 illustrates a possible approach that would develop a separate “System Characterization Program” which takes input from the Configuration Files and executes

on the targeted platform. However, another approach is to design a self-assembling compiler that generates the characterization data that would be used to assemble the compiler. All approaches that meet the AACE Program goals as described here will be considered.

Regardless of the approach chosen, the following components are required.
Processing System Characterization File: The compiler environment to direct self-assembly of an optimized compiler uses this data file. Characterization data may include:

- Micro-architecture of the node processor(s)
- Node interconnections
- Memory hierarchy of the targeted system

Executing various micro-benchmark codes will generate the characterization data. The benchmark codes will be executed on the various computational resources for the target system. These will range from a single processor to a parallel system. It is important that the results reflect the impact of the operating system (OS).

Configuration File: Should include basic information such as:

- Microprocessors and their components
- Number of cores
- Clock rate
- Memory architecture on a processor
- Memory architecture on a node/system
- Number of chips (memory and processors) per node
- Interconnection of nodes
- Composition of processing system

A back-end compiler for each type of processor core will be available. The actual protocol and data file entries that are required is for the offeror to address and propose. It will be assumed that the OS for the target computer system will be Portable Operating System Interface (POSIX) compliant.

Increased complexity in the computer system will be reflected in increased complexity in the runtime system (see Figure 2). Since the selection of compiler optimizations based on statically scheduled parallel computations on large-scale machines is a serious runtime performance problem, the runtime system will need to dynamically adapt behaviors planned at compile time to the actual performance during runtime. The capabilities should include process migration and dynamic scheduling to handle the operational vagaries of complex applications implemented on large-scale parallel machines. Equally important, runtime reoptimization presents an opportunity to improve application performance significantly. Runtime re-optimizers use lightweight mechanisms to gather information and apply that knowledge to reorganize and rewrite the running code. Specific improvement comes from tailoring the code to actual execution patterns and to values and information known only at runtime. The runtime system could collect performance data in a knowledge database that could be reused

by other applications that are executed on the system. Another feature of the runtime system could be to provide feedback to the compiler that could be used to improve the self-assembly process.

AACE development teams, in collaboration with the AACE Metrics and Evaluation Team, will collectively agree on specification methodologies for the Configuration File. Developers are expected to produce an automated approach for the selection of optimizations incorporating:

- Robust, extensible compiler development tools that will be commercially supported or provided as open source;

- Rigorous architecture-aware optimizations; and

- Support for parallel algorithms mapped to systems ranging from single multi-core processors to large-scale heterogeneous supercomputers.

One possible approach might be to form a complete compiler through the composition of multiple techniques. These techniques might focus primarily on emerging complex computing systems, but could include some existing parallel technology. AACE would automatically select the optimal techniques for the targeted computing system, and integrate them into a coherent, self-consistent compiler.

Offerors will provide two frameworks for optimization: 1) static optimization based solely on a priori characterization and configuration files, and 2) dynamic optimization based on runtime system characterization. Dynamic optimization tools might include “just-in-time” compilers, and modules that identify execution performance deficiencies at runtime. Proposals should consider runtime support for virtualization of all system resources.

One possible approach to improving the performance of MPI based applications is to optimize the data communication operations utilizing learned runtime performance data.

AACE designs may employ architecturally-aware, automatically-generated libraries for commonly executed functions. If so, proposals should address the issue of standardization of the interfaces and functionality for these libraries.

The AACE compiler should support one or more of the standard languages, such as C and/or FORTRAN, with MPI or OpenMP. Compilers that support the Partitioned Global Address Space (PGAS) Languages are also encouraged. AACE designs could include extensions or limitations to an existing language that provide better methods for expressing the parallelism exhibited by an application.

Go/No-Go decisions and down-selects will occur prior to the beginning of phases II and III. These will be based on factors that include DARPA Go/No-Go criteria, overall design quality, and the availability of funds.

Task 1 Phases, Metrics and Deliverables

Phase I Overview: Preliminary AACE Design, prototype of AACE compiler, and Preliminary Language Specification

Phase I will deliver a preliminary design document for the complete AACE. DARPA will use the Independent Compiler Evaluation Panel mentioned above to qualitatively evaluate the merits and shortcomings of each AACE development team's overall design. This panel's qualitative evaluation will reflect the possibility that superior designs may have correctable flaws that prevent superior performance on the Go/No-Go tests; inferior designs may have fluke characteristics that provide non-generalizable, non-sustainable superior performance on the Go/No-Go tests. The panel will evaluate these qualitative characteristics and provide feedback to both the development teams and the AACE Metrics and Evaluation Team.

AACE development teams must also develop and provide a prototype of their AACE compiler that will be quantitatively scored by the AACE Metrics and Evaluation Team.

Should offers include extensions or limitations to an existing language, this new language will also be evaluated. Offers that do not include language changes will not be penalized.

Phase I Metrics

There is one quantitative Go/No-Go test and one qualitative Go/No-Go evaluation based on a preliminary design review (PDR) for Phase I.

The Phase I quantitative Go/No-Go test will focus on a quantitative evaluation of the prototype AACE compiler, and viability of the preliminary AACE design. The AACE Metrics and Evaluation Team will evaluate the processing systems characterization feature of the prototype AACE compiler against three target system characterizations that they themselves create (see Task 2). The AACE developers will not know which systems will be used for the evaluation. The Go/No-Go threshold for this test is system characterization accuracy of at least 75% of the target system characterization defined by DARPA and the Task 2 evaluators.

Any preliminary design for AACE must include sufficient technical detail to provide and test performance estimates. The preliminary design and any proposed new extensions or limitations to an existing language will be qualitatively evaluated in a PDR by the Independent Compiler Evaluation Panel as well as the AACE Metrics and Evaluation Team. The PDR will be held at least one calendar quarter before the end of Phase I. Based on the findings of the Compiler Evaluation Panel, the program manager shall determine if the design will result in a compiler environment that will satisfy the goals of this program. This shall determine if the PDR requirement has been achieved.

While AACE Phase I developers passing the Go/No-Go threshold and having the strongest designs will be *eligible* to continue to Phase II, offerors are reminded that Phase II continuation is predicated on the results of the Phase I Go/No-Go, the availability of funds, and other factors. Using input from the Independent Compiler Evaluation Panel's report, DARPA will determine if a development team has successfully completed its PDR.

Phase I Deliverables

- A preliminary design of complete AACE with sufficient technical detail to evaluate correctness and capabilities.

- A prototype AACE compiler, for computing systems that ranges from multi-core single processors to heterogeneous-processor supercomputers, that demonstrates the processing system characterization feature.

- If an AACE Development Team chooses to develop a compiler for a standard language that includes extensions or limitations, then a complete specification document must be delivered.

Phase II Overview: Final AACE Design, AACE prototype, with runtime system, and Source-to-Source Language Translator

Final AACE designs will be submitted during Phase II. Midway through Phase II, there will be a critical design review (CDR) conducted by the Independent Compiler Evaluation Panel. Final feedback on AACE designs will be provided to both the AACE Developers and the AACE Metrics and Evaluation Team. During this phase, the development teams must also provide a prototype AACE that includes the runtime system, to be quantitatively tested and evaluated.

Developers will submit for evaluation (if part of their final design) a source-to-source translator for any new language that is based on extensions or limitations to an existing standard language.

Phase II Metrics

Using the reports of the Independent Compiler Evaluation Panel and the AACE Metrics and Evaluation Team, DARPA will determine if a development team has successfully completed the CDR. Phase II performers must complete a prototype of their AACE that supports the major features of the design that includes the runtime system.

There are three quantitative Go/No-Go tests and one qualitative Go/No-Go evaluation based on the CDR for Phase II.

The first quantitative Go/No-Go test involves a quantitative evaluation of the compiler system characterization feature. The AACE Metrics and Evaluation Team will test the AACE against three target system characterizations selected in conjunction with DARPA. AACE development teams will not know which computing systems will be

used for evaluation. The Phase II Go/No-Go milestone for the system characterization feature will require a system characterization accuracy of at least 90% of that achieved through independent manual efforts by the Task 2 evaluators.

The second quantitative Go/No-Go test for the Phase II prototype will be the demonstration of 10x improvement in the development time productivity compared to current compilers for the target system, for selected application codes, and must satisfy the correctness tests and execution time metrics developed by the AACE Metrics and Evaluation Team.

The third quantitative Go/No-Go test involves the demonstration of 20% improvement in the performance of selected benchmarks codes utilizing the AACE runtime system.

A CDR will be performed by the Independent Compiler Evaluation Panel to determine the strongest designs and provide final feedback to the development teams and the evaluation team. The CDR will be held during the first half of Phase II. Based on the results of the Compiler Evaluation Panel, the program manager shall determine if the design will result in a compiler environment that will satisfy the goals of this program. This shall determine if the CDR requirement has been achieved.

Phase III will be pursued based on such factors as the results of the Phase II Go/No-Go, the availability of funds, and other factors. If Phase III is warranted, Phase II teams that have satisfied the Go/No-Go metrics and have the strongest designs will be *eligible* to move on to a Phase III effort.

Phase II Deliverables

- A final AACE design, with sufficient technical detail to evaluate performance and capabilities. Performers must provide an analysis of how their design would be applied to three different application codes for three different architectures. The codes and architectures will be selected by the DARPA Program Manager. The design document and all briefing material will be provided to the DARPA Program Manager during the first half of Phase II.

- A prototype of the AACE, including the runtime system, with sufficient technical maturity to evaluate its correctness, performance, and capabilities. This should include all needed documentation, and must be provided to the DARPA Program Manager prior to the final quarter of Phase II. The prototype will be delivered with adequate functionality for meaningful evaluation and performance assessment prior to the final quarter of Phase II.

- If the development team chooses extensions or limitations for a standard language, then a source-to-source translator must be delivered to the DARPA Program Manager and the evaluators.

- Performers must provide a comprehensive plan for either productizing the AACE developed under this program for full-scale commercial availability OR releasing

the AACE developed and associated technologies as open source. This plan shall include a timetable for commercialization or release as open source

Phase III Overview: Complete AACE Integration
The key deliverable of Phase III is a complete AACE ready for final test and evaluation.

Phase III performers are expected to optimize their AACE designs based on their own analyses of Phase II results and critical design reviews. Should multiple performers remain at the end of Phase III, an "AACE Bake-Off" will be held to determine the best overall environment.

Phase III Metrics
Automatically generated compilers must pass standard compiler tests and produce correct answers for applications provided by the evaluators. Should there be multiple performers, an "AACE Bake-Off" will determine the best performer. "Bake-off" evaluation factors will include development speed, ease of use, performance - effective use of system resources, and correctness.

Phase III Deliverables

- An integrated functional AACE.
- Full system documentation.

Deliverables shall be provided prior to the last quarter of Phase III to allow performance of an "AACE Bake-Off" at the completion of Phase III.

The phases and key program elements for Task 1 are shown below in Table 1.

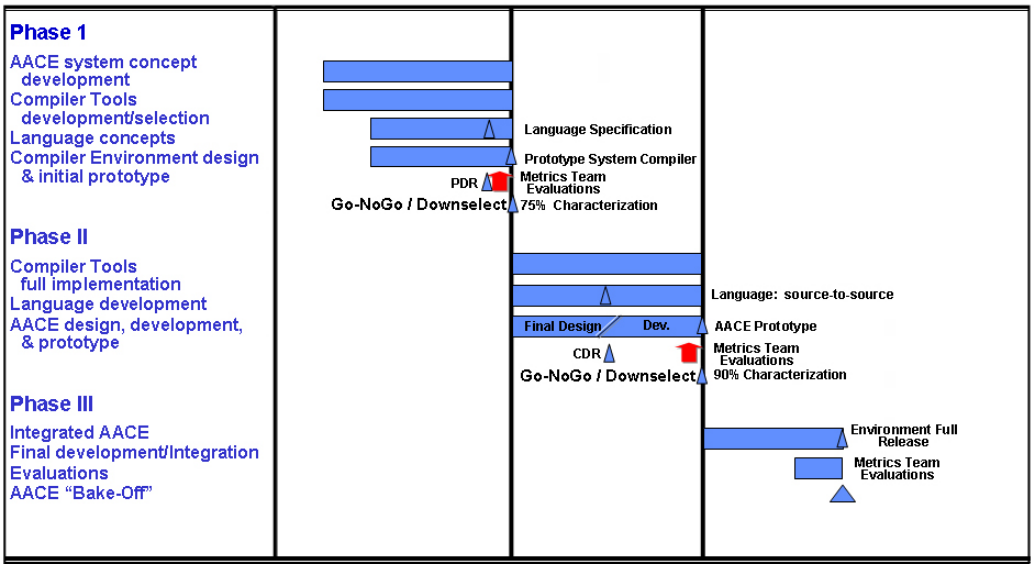

Table 1: AACE Program Task 1 Program Elements

Task 2. Test and Evaluation of AACE

A single AACE Metrics and Evaluation Team will be selected to develop metrics and evaluate the deliverables of the Task 1 AACE developers. The Metrics and Evaluation Team is expected to participate throughout all phases of the program. Continuation of this task will depend on such factors as overall performance, the decision to proceed with ongoing Task 1 activities, and availability of funds.

This team should consist of compiler development experts and related subject matter experts. The team will develop the appropriate metrics, and perform test and evaluations of the Task 1 components and complete systems. The AACE Metrics and Evaluation Team, with the collaboration of the development teams, will determine the specification for the Configuration Files. The evaluators must also determine and demonstrate the importance of each of the system characterization features to compiler design.

Task 2. Phases, Metrics and Deliverables

For Phase I, the AACE Metrics and Evaluation Team must provide a manually developed characterization of three representative computing systems. In order to manually develop representative system characterizations, the evaluation team will have access to the publicly available detailed information for any computing systems used in the program. The DARPA Program Manager will have the final approval of the selected systems. The team must demonstrate that their characterizations have the minimal, complete set of features required for compiler development.

For each of the three different systems, the team will develop a weighting scheme to apply to system characterization features. This set of weighted characterization features will form the basis of the target system configuration for testing. Offerors should provide a detailed technical description of their techniques for generating the target system characterization. A methodology and schedule for the complete test and evaluation process must also be provided. The DARPA Program Manager will review and approve the methodology and detailed metrics for evaluating the AACE Processing System Characterization File.

The Go/No-Go metric for Phase I is the completion of all Phase I deliverables.

During Phase II, the team will develop the target system configuration set for Phase II testing. The representative computing systems will be composed of three different computing systems that collectively represent a broad range of computing system architectures and capabilities. The representative computing systems developed for Phase I and Phase II must be entirely different. The DARPA Program Manager will review and approve the selection of the representative computing systems.

The AACE Metrics and Evaluation Team must develop the metrics and methodology for the quantitative evaluation of the overall AACE. This will include testing the AACE

prototype, including the runtime system. The evaluation of the overall environment must include:

1. Standard compiler tests. These may utilize current approaches where applicable, but must also develop multi-processor and multi-core processor extensions appropriate for AACE. Test methodology must include a strategy for scoring the correctness of the automatically generated compilers based on the importance of specific compiler features.

2. Techniques for testing the execution time of the compilers. Performance of this task will require careful selection of a representative set of application benchmarks, ranging from kernels to end-to-end applications.
3. Techniques for testing the computational efficiency of AACE.

4. Techniques for evaluating performance improvements when utilizing the runtime system.

5. A well-defined strategy for measuring improvements in application development time and ease of use.

6. Detailed methodology supporting DARPA-specified AACE scoring metrics.

Offers must clearly describe the metrics development and test plan. Deliverables include an overall methodology and a test and evaluation schedule for Phases I, II and III. The Metrics and Evaluation Team will design or determine the application codes to be used in the bake-off at the end of Phase III. Since it is possible that each of the AACE developer teams will develop new extensions or limitations to an existing language, the application codes will need to be written in these new languages. The DARPA Program Manager will have final approval of the selected applications.

The team will implement the “AACE Bake-Off” application test codes. The baseline version for these codes will be implemented in a standard computer language, such as C or FORTRAN. The team will also implement these applications in the languages supported by development team compilers.

The Go/No-Go metric for Phase II, is the completion of all Phase II deliverables.

During Phase III, the Metrics and Evaluation Team will complete the development of the “AACE Bake-Off” application codes and evaluate the Task 1 Phase III AACE designs using the bake-off application codes.

The key program elements for Task 2 are listed below in Table 2.

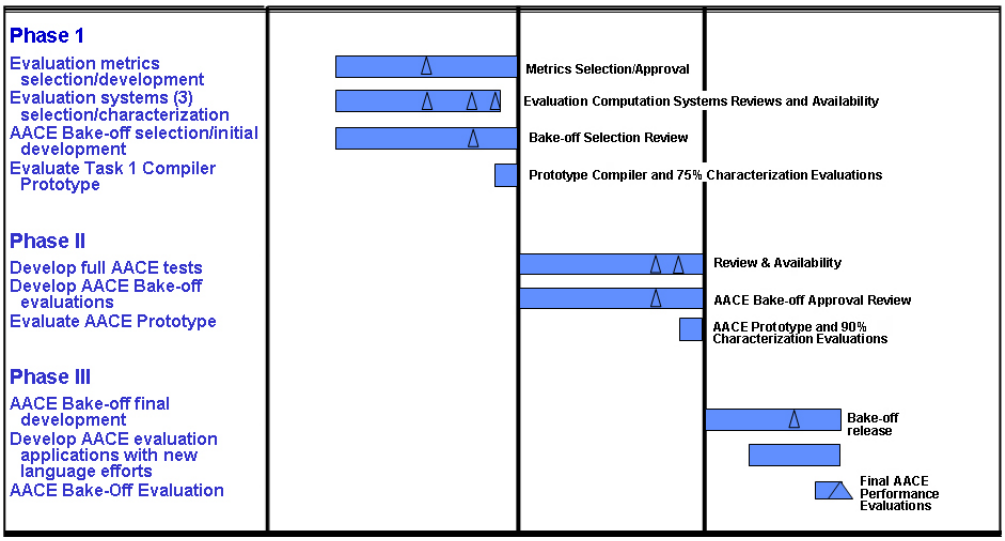

Table 2: AACE Program Task 2 Program Elements

TEAMING & COLLABORATION

Offerors are strongly encouraged to form teams that fully address the set of technologies required to accomplish AACE Program goals. These teams must provide demonstrated experience in the appropriate technology areas. Team expertise should include: compiler technology and development, processing architectures and hardware, development environments and tools, learning/cognitive techniques, high-performance computer languages, performance monitoring and analysis, runtime and OS system, and DOD application experience. Team participants should be drawn from both academic and industrial communities.

The goal of multi-discipline teaming is to achieve faster progress by creating a critical mass of relevant expertise. While DARPA expects strong, multidisciplinary teams, each team should have a single identified lead designated as the primary point of contact (POC) with DARPA. DARPA expects each team to submit a single, unified proposal. Subcontractors should not submit separate proposals.

In order for the program to make maximum progress, all performers will be required to share technical information and results with other performers.

PROGRAM SCOPE

Proposed research should investigate innovative approaches and techniques that lead to or enable revolutionary advances in the state of the art. Proposals must address the descriptions of development and evaluation areas listed above. Specifically excluded is research that primarily results in minor, evolutionary improvements to the existing state of practice or focuses on special-purpose systems or narrow applications.

II. Award Information

Multiple awards are anticipated. The amount of resources made available to this BAA will depend on the quality of the proposals received and the availability of funds. 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 offerors. The Government also reserves the right to conduct discussions if the Source Selection Authority later determines them 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 offeror. 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 offerors on the basis of the evaluation criteria listed below (see section V - Application Review Information), and program balance to provide best value to the Government. Proposals identified for negotiation may result in a contract, grant, cooperative agreement, 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 choose the appropriate instrument.

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 Disadvantaged Businesses and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals. However, no portion of this announcement will be set-aside for Small Disadvantaged Business, HBCU and MI participation due to the impracticality of reserving discrete or severable areas of this research for exclusive competition among these entities.

Independent proposals or proposals listing Government/National laboratories as subs may be subject to applicable direct competition limitations, though certain Federally Funded Research and Development Centers are excepted per P.L. 103-337§ 217 and P.L 105-261 § 3136. Offerors from Government/National laboratories must provide documentation to DARPA to establish that they are eligible to propose and have unique capabilities not otherwise available in private industry.

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

B. Cost Sharing or 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 Technology Investment Agreement under the authority of 10 U.S.C. 2371).

C. Other Eligibility Requirements

The performer selected for the Task 2 - Metrics and Evaluation effort, will not and cannot be selected for *any* portion of the Task 1 - AACE Development effort, whether as a prime or subcontractor or in any other capacity; therefore, if DARPA selects your proposal for Task 2, your proposal submitted for Task 1 will be considered as "not selectable" even if it would otherwise have been considered "selectable" according to the evaluation criteria. This is to avoid organizational conflict-of interest situations between technical and evaluation efforts and to ensure objective test and evaluation results. The Government reserves the right to choose which task proposal to select and which not to select, in cases where an offeror has submitted otherwise selectable proposals to both tasks. Eligibility for subsequent program phases is dependent on successfully meeting program metrics/milestones, funds availability and other program considerations.

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 Dr. William J. Harrod. As of the date of first publication of the BAA, the Government has not identified any potential conflicts of interest involving this program manager. 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 offeror if any appear to exist. (Please note the Government assessment does NOT affect, offset, or mitigate the offeror's own duty to give full notice and planned mitigation for all potential organizational conflicts, as discussed below.) The Program Manager is required to review and evaluate all proposals received under this BAA and to manage all selected efforts. Offerors should carefully consider the composition of their performer team before submitting a proposal to this BAA.

All offerors 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 offeror 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 offeror 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 a performer. **Proposals that fail to fully disclose potential conflicts of interests or do not have acceptable plans to mitigate indentified conflicts will be returned without technical evaluation and withdrawn from further consideration for award.**

If a prospective offeror believes that any conflict of interest exists or may exist (whether organizational or otherwise), the offeror should promptly raise the issue with DARPA by sending his/her contact information and a summary of the potential conflict by email to the mailbox address for this BAA at BAA08-30@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 returned without technical evaluation and withdrawn from further consideration for award under this BAA.

IV. Application and Submission Information

A. Address to Request Application Package

This announcement 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 it will be disregarded.

B. Content and Form of Application Submission

Responding to this announcement requires completion of an online cover sheet for each proposal prior to submission. To do so, the offeror must go to https://csc-ballston.com/baa/index.asp?BAAid=08-30 and follow the instructions there. Upon completion of the online cover sheet, a Confirmation Sheet will appear. Proposal submissions will be made via direct upload to DARPA. Instructions to do so will be provided upon completion of the cover sheet referenced above. If an offeror intends to submit more than one proposal, a unique UserId and password must be used in creating each cover sheet.

All proposals must be encrypted using Winzip or PKZip with 256-bit AES encryption. Only one zipped/encrypted file will be accepted per proposal. Proposals which are not zipped/encrypted will be rejected by DARPA. An encryption password form must be completed and emailed to BAA08-30@darpa.mil at the time of proposal submission. See https://www.CSC-Ballston.com/baa/Encryption_Instructions.htm for the encryption password form and additional encryption information. Note: the word "PASSWORD" must appear in the subject line of the above email and there are

minimum security requirements for establishing the encryption password. Failure to provide the encryption password may result in the proposal not being evaluated. **Since offerors may encounter heavy traffic on the web server, they SHOULD NOT wait until the day the proposal is due to fill out a coversheet and submit the proposal!**

Proposals not meeting the format described in this pamphlet may not be reviewed.

Proposal Preparation and Format

Proposals shall include the following sections, each starting on a new page (where a "page" is 8-1/2 by 11 inches with type not smaller than 12 point) and with text on one side only. The submission of other supporting materials along with the proposal is strongly discouraged. All submissions must be in English.

Individual elements of the proposal shall not exceed the total of the maximum page lengths for each section as shown in braces { } below.

Proposal Section 1- Administrative

1.1 Confirmation Sheet (as described above) will contain the following information:

- BAA number;
- Task;
- Proposal title;
- Technical point of contact including: name, telephone number, electronic mail address, fax (if available), and mailing address;
- Administrative point of contact including: name, telephone number, electronic mail address, fax (if available), and mailing address;
- Summary of the costs of the proposed research, including total base cost, estimates of base cost in each year of the effort, estimates of itemized options in each year of the effort, and cost sharing if relevant;
- Contractor's Reference Number (if any)
- Contractor's type of business, selected from among the following categories:
  - WOMEN-OWNED LARGE BUSINESS,
  - OTHER LARGE BUSINESS,
  - SMALL DISADVANTAGED BUSINESS [Identify ethnic group from among the following: Asian-Indian American, Asian-Pacific American, Black American, Hispanic American, Native American, or Other],
  - WOMEN-OWNED SMALL BUSINESS,
  - OTHER SMALL BUSINESS,
  - HBCU,
  - MI,
  - OTHER EDUCATIONAL,
  - OTHER NONPROFIT,
  - FOREIGN CONCERN/ENTITY.

1.2 Table of contents {No page limit}

1.3 PowerPoint summary chart {1 Chart}: a one slide summary of the proposal in PowerPoint that effectively and succinctly conveys the main objective, key innovations, expected impact, and other unique aspects of the proposal.

Proposal Section 2. Detailed Proposal Information

This section provides the detailed discussion of the proposed work necessary to enable an in-depth review of the specific technical and managerial issues. Specific attention must be given to addressing both risk and payoff of the proposed work that make it desirable to DARPA.

2.1 Innovative claims for the proposed research. {3 Pages}

This page is the centerpiece of the proposal and should succinctly describe the unique areas of the proposed approach and contributions.

2.2 Proposal Roadmap {2 Pages}

The roadmap provides a top-level view of the content and structure of the proposal. It contains a synopsis for each of the roadmap areas defined below, which should be elaborated elsewhere. It is important to make the synopses as explicit and informative as possible. The roadmap must also cross-reference the proposal page number(s) where each area is elaborated. The required roadmap areas are:

a. Main goals of the proposed research.
b. Tangible benefits to end users (i.e., benefits of the capabilities afforded if the proposed technology is successful).
c. Critical technical barriers (i.e., technical limitations that have, in the past, prevented achieving the proposed results).
d. Main elements of the proposed technical approach.
e. Basis of confidence (i.e. rationale that builds confidence that the proposed approach will overcome the technical barriers).
f. Nature and description of end results to be delivered to DARPA. In what form will results be developed and delivered to DARPA and the scientific community? Note that DARPA encourages experiments, simulations, specifications, proofs, etc. to be documented and published to promote progress in the field. Offerors should specify both final and intermediate products.
g. Cost and schedule of the proposed effort.

2.3 Detailed Research Objectives {3 Pages}

a. Problem Description. Provide a concise description of the problem areas addressed. Make this specific to your approach and application domain.
b. Research Goals. Identify specific research goals. Goals can be both system level and details.
c. Expected Impact. Describe the expected impact of your research.

2.4 Technical Approach and Evaluation:

a. **{20 Pages}** Technical Approach. Provide a detailed, but concise, terse description of the technical approach. This section will elaborate on many of the topics identified in the proposal roadmap and will serve as the primary expression of the offerors' scientific and technical ideas. Offerors are advised to focus on the specific details of their technical approach; they are advised not to include generic background material that is not relevant to their approach. For example, statements on the necessity of addressing multi-core processors are not necessary and detract from the credibility of the proposed technology. Offerors are also advised to present a logical, coherent description of and rationale for their technical approach.

b. **{5 Pages}** Comparison with Current Technology. Describe state of the art approaches and the limitations that relate to the implementation and efficiency of compiler environments. Describe and analyze state of the art results, approaches, and limitations within the context of the problem area addressed by this research. Demonstrating problem understanding requires not just the enumeration of related efforts; rather, related work must be compared and contrasted to the proposed approach.

2.5 Overall Statement of Work (SOW) {4 Pages}

In plain English, clearly define the technical tasks/subtasks to be performed, their durations, and dependencies among them. For each task/subtask, provide:

- A general description of the objective (for each defined task/activity);
- A detailed description of the approach to be taken to accomplish each defined task/activity);
- Identification of the primary organization responsible for task execution (prime, sub, team member, by name, etc.);
- The exit criteria for each task/activity - a product, event or milestone that defines its completion.
- Define all deliverables (reporting, data, reports, software, etc.) to be provided to the Government in support of the proposed research tasks/activities.

Note: The SOW should be developed so that each Phase of the program is separately defined. Phase I should be the base period with Phases II and III as options. Do not include any proprietary information in the SOW.

2.6 Deliverables Description {3 Pages}

List and provide detailed description for each proposed deliverable. Include in this section all proprietary claims to results, prototypes, or systems supporting and/or necessary for the use of the research, results, and/or prototype. Offerors are reminded that performers must commit to either commercializing their AACE or releasing the environment as open source. If there are no proprietary claims, this should be stated. The offeror must submit a separate list of all technical data or computer software that

will be furnished to the Government with other than unlimited rights. Specify receiving organization and expected delivery date for each deliverable.

2.7 Management Plan {6 Pages}

Establish that the proposed team composition, capability, size, and cost are both necessary and sufficient to meet the program objectives. Describe formal teaming agreements that are required to execute this program, a brief synopsis of all key personnel, and a clearly defined organization chart for the program team (prime contractor and subcontractors, if any). Information in this section must cover the following information:

a. Detailed task descriptions and responsibilities of each individual and/or subcontractor team members;
b. Programmatic relationships and interdependencies of team members for each individual and/or subcontractor effort (If proposal includes subcontractors that are geographically distributed, clearly specify working / meeting models. Items to include in this category include software/code repositories, laboratory or development facilities, physical and virtual meeting plans, and online communication systems that may be used.);
c. Detailed overview of how these individual efforts and subcontract activities are to be combined to address critical and overall program objectives;
d. Unique capabilities of team members;
e. Teaming strategy among the team members;
f. Key personnel and their position, responsibilities, and synopsis of their background/experience specifically relevant their assigned position and responsibility along with the amount of effort to be expended by each person during each year;
g. To the extent that graduate students and postdocs are involved in individual efforts, describe their role and contribution; and
h. Government role in project, if any.

2.8 Schedule and Milestones.

This section should include:

a. **{1 Page}** Schedule Graphic. Provide a graphic representation of project schedule including detail down to the key individual effort level. This should include but not be limited to, a multi-effort, phased development plan, which demonstrates a clear understanding of the proposed research; and a plan for periodic and increasingly robust demonstrations of developing capabilities over the project life that will show applicability to the overall program concept and goal. Show all project milestones. Use “x months after contract award” designations for all dates.
b. **{3 Pages}** Reference and link the individual task descriptions and responsibilities provided as directed in section 2.7-Management Plan above to the activities and milestones of the schedule graphic.

2.9 Personnel, Qualifications, and Commitments {No page limit}
List key personnel (making sure this list is consistent with the information provided as directed in section 2.7-Management Plan above) providing a concise summary of relevant qualifications, discussion of offeror's previous accomplishments, and work in the area for which they are proposed or closely related research areas. Indicate the level of effort in terms of hours to be expended by each person during each contract year and other (current and proposed) major sources of support for them and/or commitments of their efforts. Provide a list of all current and pending support (both Federal and non-Federal) for the Project Director/Principal Investigator(s) (PD/PI) and senior/key persons, including subawardees, for ongoing projects and pending applications. For each organization providing support, show the number of person-months per year to be devoted to the project by the senior/key person. DARPA expects all key personnel associated with a proposal to make substantial time commitment to the proposed activity and the proposal will be evaluated accordingly.

Include a table of key individual time commitments as follows:

Key Individual	Project	Pending/Current	2007	2008	2009	2010
Jane Doe	AACE	Proposed	YYY hours	ZZZ hours	UUU hours	WWW hours
	Project 1	Current	2 hours	n/a	n/a	n/a
	Project 2	Pending	100 hours	100 hours	n/a	n/a
John Deer	AACE	Proposed				

2.10 Organizational Conflict of Interest Affirmations and Disclosure {No page limit}

Per the instructions in Section III.C.1 above, provide documentation on whether any team member is 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 offeror supports and identify the prime contract numbers. This disclosure must include a description of the action the offeror has taken or proposes to take to avoid, neutralize, or mitigate such conflict. **Proposals that fail to fully disclose potential conflicts of interests or do not have acceptable plans to mitigate identified conflicts will be returned without technical evaluation and withdrawn from further consideration for award.** If the offeror is not currently providing SETA support as described, then the offeror should state "NONE."

2.11 {No page limit} Intellectual Property
Per section VI.B.3 below, offerors responding to this BAA shall identify any intellectual property restrictions. If no restrictions are intended, then the offeror should state "NONE".

2.12 Human use {No page limit}
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. For further information on this subject, see Section V.I.3 below.

If human use is not a factor in a proposal, then the offeror should state "NONE."

Proposal Section 3 Cost Proposal – {No Page Limit}
3.1 Cover sheet

- Name and address of offeror (include zip code);
- Name, title, and telephone number of offeror's point of contact;
- Award instrument requested: cost-plus-fixed-fee (CPFF), cost-contract--no fee, cost sharing contract--no fee, or other type of procurement contract (specify), agreement, or other award instrument;
- Place(s) and period(s) of performance;
- Funds requested from DARPA for the Base Effort, each option and the total proposed cost; and the amount of cost share (if any);
- Name, mailing address, telephone number and Point of Contact of the offerors cognizant government administration office (i.e., Office of Naval Research/Defense Contract Management Agency (DCMA)) (if known);
- Name, mailing address, telephone number, and Point of Contact of the Offeror's cognizant Defense Contract Audit Agency (DCAA) audit office (if known);
- Any Forward Pricing Rate Agreement, other such Approved Rate Information, or such other documentation that may assist in expediting negotiations (if available);
- Contractor and Government Entity (CAGE) Code;
- Dun and Bradstreet (DUN) Number;
- North American Industrial Classification System (NAICS) Number [NOTE: This was formerly the Standard Industrial Classification (SIC) Number];
- Taxpayer Identification Number (TIN); and

3.2 Cost Details
This section shall contain the following tables (See appendix for sample templates. All tables must include Overhead Rates and Charges applied to all costs.). Proposals should be formatted with Phase I as the Base Effort and Phases II and III as options.

Summary (Table 1) Summarize the proposed costs for the entire effort, broken down annually by project phase and task, i.e., show the costs of each project task for each phase. Calculate the subtotal for each task.

Labor (Table 2) Detail labor costs per year, broken down by labor category/individual, phase and task. List and describe labor categories.

Equipment and Direct Materials (Tables 3 and 4) Outline expected major direct material and equipment costs by Phase and Task. Table 3 should detail estimated direct material costs per year, broken down by year, phase and task. Table 4 should summarize planned equipment purchases by year, broken down by item, phase and task. Also include a brief description of each planned equipment purchase and the source of estimated cost.

Subcontracts (Table 5) Detail planned subcontractor costs, by year, broken down by subcontract, phase and task. Also include a short summary of the work to be performed and the source of the estimated cost.

Travel (Table 6) Detail planned travel by trip type, length, origination/destination, by year, phase and task.

Other Costs (Table 7) Detail and itemize any other direct costs not included above.

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. Supporting cost and pricing information in sufficient detail to substantiate the summary cost estimates 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 offeror is seeking a procurement contract award of $650,000 or greater unless the offeror request an exception from the requirement to submit cost of pricing data. "Cost or pricing data" are not required if the offeror 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 shall be made immediately available to the Government, upon request, under separate cover (i.e., mail, electronic/email, etc.), either by the Proposer or by the subcontractor organization.

3.3 Government Furnished Property

Contractors requiring the purchase of information technology (IT) resources[1] as Government Furnished Property (GFP) MUST attach to the submitted proposals the following information:

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

- A letter on corporate letterhead signed by a senior corporate official and addressed to Mr. William Harrod, Program Manager, DARPA/IPTO, stating that you either cannot or will not provide the information technology (IT) resources necessary to conduct the said research.
- An explanation of the method of competitive acquisition or a sole source justification, as appropriate, for each IT resource item.
- If the resource is leased, a lease/purchase analysis clearly showing the reason for the lease decision.
- The cost for each IT resource item.

C. Submission Dates and Times

The full proposal must be submitted to DARPA by 12:00 PM (ET) 02 Jun 2008 (initial closing), in order to be considered during the initial evaluation phase. However, BAA 08-30 will remain open until 12:00 NOON (ET) 02 Jun 2009 (final closing date). Thus, proposals may be submitted at any time from issuance of this announcement through 12:00 NOON (ET) 02 Jun 2009, however, offerors are warned that the likelihood of funding is greatly reduced for proposals submitted after the initial closing date deadline.

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 - N/A

E. Funding Restrictions

The FY2008 Defense Appropriations Act caps indirect cost rates for any procurement contract or agreement using 6.1 Basic Research FY08 Funding at 35% of the total cost of the award. Total costs include all bottom line costs. Indirect costs are all costs of a prime award that are Facilities and Administration costs (for awardees subject to the cost principles in 2 CFR part 220) or indirect costs (for awardees subject to the cost

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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, is not information technology."

principles in 2 CFR part 225 or 230 or 48 CFR part 32). The cost limitations do not flow down to subcontractors.

F. Other Submission Requirements

Proposals MUST NOT be submitted to DARPA in hard copy (see Submission instructions above in Section IV.B).

University (prime) grant submissions may be made via the Grants.gov web site (http://www.grants.gov/) by using the "Apply for Grants" function. Duplicate submissions should not be uploaded to DARPA via the online tool described above in Section IV.B. however offerors must still submit an online coversheet as described there.

V. Application Review Information

A. Evaluation Criteria

Evaluation of proposals will be accomplished through a scientific review of each proposal using the following criteria. While these criteria are listed in descending order of relative importance, it should be noted that the combination of all non-cost evaluation factors is significantly more important than cost.

1. Evaluation Criteria for Proposals Submitted under Task 1 – AACE Development:

a. Ability to Meet Program Go/No-Go Metrics
b. Innovativeness of the Proposed Technical Solution
c. Soundness of Technical Approach
d. Offeror's Capabilities, Commitments and Related Experience
e. Potential Contribution and Relevance to the DARPA Mission
f. Realism of Proposed Schedule
g. Plans and Capability to Accomplish Technology Transition
h. Cost Realism

2. Evaluation Criteria for Proposals Submitted Under Task 2 -- AACE Evaluation:

a. Ability to Meet Program Go/No-Go Metrics
b. Soundness of Technical Approach
c. Innovativeness of the Proposed Technical Solution
d. Offeror's Capabilities, Commitments and Related Experience
e. Realism of Proposed Schedule
f. Potential Contribution and Relevance to the DARPA Mission
g. Cost Realism

EVALUATION CRITERIA DEFINITIONS FOR PROPOSALS SUBMITTED UNDER TASK 1

a. Ability to meet Program Go/No-Go Metrics

The feasibility and likelihood of the proposed approach for satisfying the program Go/No-Go metrics are explicitly described and clearly substantiated. The proposal reflects a mature and quantitative understanding of the performance Go/No-Go metrics, the statistical confidence with which they may be measured, and their relationship to the concept of operations that will result from successful performance in the program. The following table lists the Go/No-Go metrics for Task 1.

Phase I	Phase II
PDR (Preliminary Design Review) of AACE prototype compiler design, including possible new language	CDR (Critical Design Review) of full AACE design
Processing systems characterization feature tested against 3 systems – with at least 75% accuracy	Processing systems characterization feature tested against 3 systems – with at least 90% accuracy
	Demonstration of 10X improvement in development time productivity
	Demonstration of 20% performance improvement using the runtime environment

b. Innovativeness of the Proposed Technical Solution

Offerors must develop highly innovative techniques (that do not currently exist) for creating Architecture Aware Compiler Environments (AACE) for the high-performance computing systems described in the body of this solicitation. Offerors may only utilize existing technologies if they do so in an innovative way AND if they support the objectives of the proposed effort. The proposed concepts and systems should show breadth of innovation across all the dimensions of the proposed solution. The technical concepts should be clearly defined and developed.

c. Soundness of Technical Approach

Offerors must provide a detailed but concise description of their technical approach. The approach must be sufficiently detailed and substantiated by evidence to support the proposed concepts and technical claims. The proposal must clearly conform to the stipulated metrics and evaluation plans. The proposal must also clearly define a system integration approach and plan. Offerors are advised to focus on the specific details of their technical approach and omit unnecessary, generic background material that

detracts from the coherency of their approach. They are also advised to present a succinct, logical, coherent description of and rationale for their technical approach.

d. Offeror's Capabilities, Commitments and Related Experience

The objective of this criterion is to establish that the offeror has credible capability and experience to complete the proposed work. The offeror's prior experience in similar efforts must clearly demonstrate an ability to deliver products that meet the proposed technical performance within the proposed budget and schedule. The proposed team must demonstrate the expertise to manage the cost and schedule. Similar efforts completed/ongoing by the offeror in this area are fully described including identification of other Government sponsors. The qualifications, capabilities, and demonstrated achievements of the proposed principals and other key personnel for the primary and subcontractor organizations must be clearly established. Moreover, the key individuals must commit sufficient time to the project to ensure its success. The offerors should have a track record of innovation and leadership in the relevant disciplines, and should be professionally well-positioned to influence the research agendas of entire disciplines. Offerors should have sufficient professional and research expertise to be able to react appropriately, plan, and re-plan when serendipitous technical advances and negative results arise.

e. Potential Contribution and Relevance to the DARPA Mission

The objective of this criterion is to establish a strong link between this work and the DARPA mission. 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 military use. While it is not necessary that the proposed work be immediately usable in military and commercial systems, it is desirable. It is however, necessary that this work contribute to technical areas of need by the DOD. The offeror need not focus on military details but may instead clearly address more generally how the proposed effort will advance the DARPA goals of superior and revolutionary insight into the potential contributions of the proposed effort with relevance to the national technology base.

f. Realism of Proposed Schedule

The offeror's ability to aggressively pursue identified critical technical limitations and develop and demonstrate key advances in the shortest timeframe and to accurately account for that timeframe will be evaluated. The credibility of the proposed research agenda and associated timelines as they relate to the proposed activities, milestones, and overall developed capabilities will be evaluated.

g. Plans and Capability to Accomplish Technology Transition

The offeror will be evaluated on their capability to transition the technology to the research, industrial, and operational military communities in such a way as to enhance U.S. defense. *Offerors should provide a clear explanation of how the technologies to be developed will be transitioned for government use and available as open source to the*

user community. Also considered will be impediments to future transition, including intellectual property restrictions.

h. 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 offeror's practical understanding of the effort. This will be principally measured by cost per labor-hour and number of labor-hours proposed. The evaluation criterion recognizes that undue emphasis on cost may motivate offerors 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. Cost reduction approaches that will be received favorably include innovative management concepts that maximize direct funding for technology and limit diversion of funds into overhead. The overall estimated costs should be clearly justified and appropriate for the technical complexity of the effort. The evaluation will consider the value of the research to the government and the extent to which the proposed management plan will effectively achieve the capabilities proposed.

EVALUATION CRITERIA DEFINITIONS FOR PROPOSALS SUBMITTED UNDER TASK 2

a. Ability to meet Program Go/No-Go Metrics

The feasibility and likelihood of the proposed approach for satisfying the program Go/No-Go metrics are explicitly described and clearly substantiated. The proposal reflects a mature and quantitative understanding of the performance Go/No-Go metrics, the statistical confidence with which they may be measured, and their relationship to the concept of operations that will result from successful performance in the program.

The following table lists the Go/No-Go metrics for Task 2.

Phase I	Phase II
Completion of all deliverables	Completion of all deliverables

b. Soundness of Technical Approach

Offerors must provide a detailed but concise description of their technical approach. The approach must be sufficiently detailed and substantiated by evidence to support the proposed concepts and technical claims. The proposal must clearly conform to the stipulated metrics and evaluation plans. The proposal must also clearly define a system integration approach and plan. Offerors are advised to focus on the specific details of their technical approach and omit unnecessary, generic background material that detracts from the coherency of their approach. They are also advised to present a succinct, logical, coherent description of and rationale for their technical approach.

c. Innovativeness of the Proposed Technical Solution

Offerors must develop highly innovative techniques (that do not currently exist) for evaluating AACE Task 1 development efforts for the high-performance computing systems described in the body of this solicitation. Offerors may only utilize existing technologies if they do so in an innovative way AND if they support the objectives of the proposed effort. The proposed concepts and approaches should show breadth of innovation across all the dimensions of the proposed solution. The technical concepts should be clearly defined and developed.

d. Offeror's Capabilities, Commitments and Related Experience

The objective of this criterion is to establish that the offeror has credible capability and experience to complete the proposed work. The offeror's prior experience in similar efforts must clearly demonstrate an ability to deliver products that meet the proposed technical performance within the proposed budget and schedule. The proposed team must demonstrate the expertise to manage the cost and schedule. Similar efforts completed/ongoing by the offeror in this area are fully described including identification of other Government sponsors. The qualifications, capabilities, and demonstrated achievements of the proposed principals and other key personnel for the primary and subcontractor organizations must be clearly established. Moreover, the key individuals must commit sufficient time to the project to ensure its success. The offerors should have a track record of innovation and leadership in the relevant disciplines, and should be professionally well-positioned to influence the research agendas of entire disciplines. Offerors should have sufficient professional and research expertise to be able to react appropriately, plan, and re-plan when serendipitous technical advances and negative results arise.

e. Realism of Proposed Schedule

The offeror's ability to aggressively pursue performance metrics in the shortest timeframe and to accurately account for that timeframe will be evaluated. The credibility of the proposed research agenda and associated timelines as they relate to the proposed activities, milestones, and overall developed capabilities will be evaluated.

f. Potential Contribution and Relevance to the DARPA Mission

The objective of this criterion is to establish a strong link between this work and the DARPA mission. 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 military use. While it is not necessary that the proposed work be immediately usable in military and commercial systems, it is desirable. It is however, necessary that this work contribute to technical areas of need by the DOD. The offeror need not focus on military details but may instead clearly address more generally how the proposed effort will advance the DARPA goals of superior and revolutionary insight into the potential contributions of the proposed effort with relevance to the national technology base.

g. 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 offeror's practical understanding of the effort. This will be principally measured by cost per labor-hour and number of labor-hours proposed. The evaluation criterion recognizes that undue emphasis on cost may motivate offerors 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. Cost reduction approaches that will be received favorably include innovative management concepts that maximize direct funding for technology and limit diversion of funds into overhead. The overall estimated costs should be clearly justified and appropriate for the technical complexity of the effort. The evaluation will consider the value of the research to the government and the extent to which the proposed management plan will effectively achieve the capabilities proposed.

B. Review and Recommendation Process

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 the Proposal Preparation and Format Section above.

Restrictive notices notwithstanding, support contractors may handle proposals for administrative purposes. 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.

It is the policy of DARPA to treat all proposals as competitive information and to disclose their contents only for the purpose of evaluation. No proposals will be returned. Upon completion of the source selection process, the original of each proposal received will be retained at DARPA and all other copies will be destroyed.

Award(s) will be made to offerors 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 offeror(s) whose proposal(s) is determined selectable regardless of its overall rating.

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

VI. Award Administration Information

A. Award Notices

As soon as the evaluation of a proposal is complete, the offeror 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 US mail to the Technical POC identified on the proposal coversheet.

B. Administrative and National Policy Requirements

1. Meeting and Travel Requirements

There will be two program wide PI meetings anticipated to occur every year, as well as one or two review meetings with the Program Manager and each team. Each team and all key team participants will be expected to participate in these meetings. Performers should also anticipate periodic site visits at the Program Manager's discretion. Performers will be expected to participate in various technical exchanges and coordination and planning activities with DARPA and other participants. For budgetary purposes, sites should plan on sending representatives to two 3-day AACE Program wide meetings per year. These will be in addition to whatever travel is needed for collaboration within a research team.

2. Security Classification

Security classification guidance on a DD Form 254 (DoD Contract Security Classification Specification) will not be provided at this time since DARPA is soliciting ideas only and does not encourage classified proposals in response to this announcement. However, after reviewing incoming proposals, if a determination is made that contract award may result in access to classified information, a DD Form 254 will be issued upon contract award. *If you choose to submit a classified proposal you must first receive the permission of the Original Classification Authority to use its information in replying to this announcement.*

3. Intellectual Property

All software, software documentation, source code, and technical data developed under AACE will be provided to the government with a minimum of Government Purpose Rights. To the greatest extent feasible, therefore, offerors should not include background proprietary software and data as the basis of their proposed approach. Offerors expecting to utilize, but not to deliver, open source tools or other materials in implementing their approach must ensure that the government does not incur any legal obligation due to such utilization. All references to "unlimited" or "government purpose

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

a. Procurement Contract Offerors

i. **Noncommercial Items (Technical Data and Computer Software)**

Offerors 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. Offerors shall follow the format under DFARS 252.227-7017 for this stated purpose. In the event that offerors 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 offerors 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. Offerors are admonished that the Government will use the list during the source selection evaluation process to evaluate the impact of any identified restrictions and may request additional information from the offeror, as may be necessary, to evaluate the offeror's assertions. If no restrictions are intended, then the offeror 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)

ii. **Commercial Items (Technical Data and Computer Software)**

Offerors 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 offerors 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 source selection evaluation process to evaluate the impact of any identified restrictions and may request additional information from the offeror, as may be necessary, to evaluate the offeror's assertions. If no restrictions are intended, then the offeror 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 Offerors – Noncommercial and Commercial Items (Technical Data and Computer Software)

Offerors responding to this BAA requesting an Other Transaction Agreement, grant or Cooperative Agreement 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, offerors may use a format similar to that described above. The Government may use the list during the source selection evaluation process to evaluate the impact of any identified restrictions, and may request additional information from the offeror, as may be necessary, to evaluate the offeror's assertions. If no restrictions are intended, then the offeror should state "NONE."

c. All Offerors – 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.

d. All Offerors – 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, offerors 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.

4. 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 for all investigators, should 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 for one to three months, followed by a DoD review that can last for three to six months. No DoD/DARPA funding can be used toward human subjects research until ALL approvals are granted.

5. 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

6. Publication Approval

Offerors are advised if they propose grants or cooperative agreements, DARPA may elect to award other award instruments. DARPA will make this election if it determines that the research resulting from the proposed program will present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Under such circumstances, any resulting award will include a requirement for DARPA permission before publishing any information or results on the program; therefore, the following provision will be incorporated into any resultant procurement contract, cooperative agreement or Other Transaction:

“When submitting material for written approval for open publication as described above, 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."

7. 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:

- 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, 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.
- 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 technical data or software.
- The Contractor shall be responsible for all regulatory record keeping requirements associated with the use of licenses and license exemptions/exceptions.
- The Contractor shall be responsible for ensuring that the provisions of this clause apply to its subcontractors**.**

8. 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.

9. Central Contractor Registration (CCR)

Proposers selected, but 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

10. On-line Representations and Certifications (ORCA)

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

11. 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.

C. Reporting Requirements

1. Technical – Financial Information Management System (T-FIMS)

The award document for each proposal selected and funded may contain a mandatory requirement for four DARPA/IPTO Quarterly Status Reports each year, one of which will be an annual project summary. These reports will be electronically submitted by each awardee under this BAA via the DARPA Technical – Financial Information Management System (T-FIMS). The T-FIMS URL and instructions will be furnished by the contracting agent upon award.

In addition, each performing contractor (including subs) on each team will be expected to provide monthly status reports to the Program Manager. There may also be additional reporting requirements for cooperative agreements.

2. I-Edison

All required reporting shall be accomplished, as applicable, using the i-Edison.gov reporting website at http://s-edison.info.nih.gov/iEdison

VII. Agency Contacts

DARPA will use electronic mail for all technical and administrative correspondence regarding this BAA, with the exception of selected/not-selected notifications.

Administrative, technical or contractual questions should be sent via e-mail to BAA08-30@darpa.mil. If e-mail is not available, please fax questions to 703-741-0091, Attention: AACE Solicitation. All requests must include the name, email address, and phone number of a point of contact.

Solicitation Web site: http://www.darpa.mil/ipto/solicit/solicit.asp.

VIII. Other Information

1. The solicitation web page at http://www.darpa.mil/ipto/solicit/solicit.asp may have a Frequently Asked Questions (FAQ) list.

2. Earlier this year, DARPA published a Request for Information on Efficient Compilation and Code Development (ECCD). In addition, a workshop was held involving the participants in the RFI. Both the RFI (RFI08-03) and the Workshop proceedings may be found at http://www.darpa.mil/ipto/personnel/harrod.asp. Participation in either the ECCD RFI or the ECCD Workshop were NOT prerequisites to submitting to the AACE BAA. In addition, AACE BAA offerors are assured that ECCD RFI respondents or ECCD Workshop attendees will, in no way, receive any special consideration for their ECCD participation.

3. Appendix – Sample Cost Detail Templates

Table 1 – Total Cost – detail $ and %

	2008	2009	2010	2011	Total
Phase 1					
Task 1:					
Labor (section 1.1)	$	$	$	$	**$**
Direct Materials (section 1.2)	$	$	$	$	**$**
Equipment (section 1.3)	$	$	$	$	**$**
Subcontracts	$	$	$	$	**$**
Travel	$	$	$	$	**$**
Other Costs	$	$	$	$	**$**
Subtotal Task 1					
Task 2:					
Labor (section 1.1)	$	$	$	$	**$**
Direct Materials (section 1.2)	$	$	$	$	**$**
Equipment (section 1.3)	$	$	$	$	**$**
Subcontracts	$	$	$	$	**$**
Travel	$	$	$	$	**$**
Other Costs	$	$	$	$	**$**
Subtotal Task 2					
Total Cost	**$**	**$**	**$**	**$**	**$**

Table 2 - Labor

Category	2008	2009	2010	2011	Total
Phase 1, Task 1:					
(Labor Category) ABC	$	$	$	$	$
(Labor Category) XYZ	$	$	$	$	$
Phase 1, Task 2	$	$	$	$	$
ABC					
Total	$	$	$	$	$

Table 3 - Estimated Direct Materials Costs

Material	2008	2009	2010	2011	Total
Phase 1, Task 1:					
ABC	$	$	$	$	$
123	$	$	$	$	$
XYZ	$	$	$	$	$
Other Direct Materials	$	$	$	$	$
Total	$	$	$	$	$

Table 4 - Estimated Equipment Costs

- Equipment A required for … Cost based on estimate from supplier X.
- Equipment B required for … Cost based on …

Equipment and Materials	**2008**	**2009**	**2010**	**2011**	**Total**
Phase 1, Task 1:	$	$	$	$	$
Equipment A	$	$	$	$	$
Equipment B	$	$	$	$	$
	$	$	$	$	$
Total	$	$	$	$	$

Table 5 – Subcontracts

- Company A – Will provide … Cost based on …
- Company B – Will provide … Cost based on proposal dated
- University C – Perform tasks A, B, C … Cost based on …

	2008	**2009**	**2010**	**2011**	**Total**
Phase 1, Task 1:					
Company A	$10,000	$10,000			$20,000
Phase 1, Task 2:					
Company B			15,000	10,000	$25,000
University C	$20,000	$20,000	$20,000		$60,000
Total	**$30,000**	**$30,000**	**$35,000**	**$10,000**	**$105,000**

Table 6 – Travel

Trip A – PI Meeting, 3 days, CA to DC, 2 per year.
Trip B – Review Meeting, 2 days, CA to DC, 2 per year.

	Cost Per Trip	2008	2009	2010	2011	Total
Trip A	**$2000**	$4000	$4000	$4000	$4000	**$16,000**
Trip B	**$1,500**	$3000	$3000	$3000	$3000	**$12,000**
Total		**$7000**	**$7000**	**$7000**	**$7000**	**$28,000**

Table 7 - Other Costs

	2008	2009	2010	2011	Total
Cost A	$	$	$	$	$
Cost B	$	$	$	$	$
Total	$	$	$	$	$