



**Broad Agency Announcement (BAA)**

# **Vulcan**

## **Turbine/Constant Volume Combustion Engine Demonstration Program**

**Defense Advanced Research Projects Agency  
DARPA/TACTICAL TECHNOLOGY OFFICE (TTO)  
3701 N. Fairfax Drive  
Arlington, VA 22203-1714**

**DARPA BAA 08-53**

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## Part One: Overview Information

- **Federal Agency Name** – Defense Advanced Research Projects Agency (DARPA), Tactical Technology Office (TTO)
- **Funding Opportunity Title** – Vulcan
- **Announcement Type** – Initial Announcement
- **Funding Opportunity Number** – Broad Agency Announcement (BAA) 08-53
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** (N/A)
- **Dates** –
  - **Proposal Due Date (Initial Selection Round): 15 September 2008**
  - **BAA Closing Date: 29 July 2009**
- **Anticipated individual awards** – Multiple awards are anticipated.
- **Types of instruments that may be awarded** – Procurement contract or Other Transaction Agreement. Grants and cooperative agreements will not be awarded under this solicitation.
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## **Part Two: Full Text of Announcement**

### **I. FUNDING OPPORTUNITY DESCRIPTION**

The Defense Advanced Research Projects Agency often selects its research efforts through the Broad Agency Announcement (BAA) process. The BAA will appear first on the FedBizOpps website, <http://www.fedbizopps.gov/>, then the agency website at <http://www.darpa.mil/tto/solicitations.htm> . The following information is for those wishing to respond to the BAA.

#### **A. Program Overview**

The Defense Advanced Research Projects Agency (DARPA) is seeking innovative propulsion system solutions for full scale hypersonic vehicles. The use of a BAA solicitation provides the Government with the flexibility to develop a tailored program plan that best advances the Vulcan program goals.

Constant Volume Combustion (CVC) engines have been under development for more than a decade. Considerable progress has been made and the technology is believed mature enough to enable a dramatic new propulsion system capability. CVC engines when combined with turbine engines offer the ability to design a new class of Mach 4+ air breathing engines.

The goal of the Vulcan demonstration program is to design, build and ground test an engine capable of accelerating a full scale hypersonic vehicle from rest to Mach 4+. The Vulcan engine will consist of a CVC engine, a full scale turbine engine, an inlet and a nozzle. CVC engine architectures could include Pulsed Detonation Engines (PDE's), Continuous Detonation Engines (CDE's) or other unsteady CVC engine architectures. The CVC engine would operate from below the upper Mach limit of the turbine engine to Mach 4+. The turbine engine will be a current production engine capable of operating above Mach 2 and may be based on any of the following list: the F100-229, F110-129, F119 or F414. Key objectives of the program are to integrate the turbine engine into the Vulcan engine with minimal modification to the turbine engine; to operate the turbine engine from rest to its upper Mach limit; and to cocoon the turbine engine when it is not in use. It is desired that both the turbine and the CVC engines share a common inlet and nozzle. The inlet and nozzle will both be capable of flow path switching to provide the proper amount of air to the CVC engine and turbine engine. It is envisioned that developing the Vulcan engine will enable full scale hypersonic cruise vehicles for intelligence, surveillance, reconnaissance, strike or other critical national missions.

The Vulcan demonstration program will be conducted in four phases:

- Phase I: Vulcan System Concept Definition
- Phase II: Component Demonstration and Risk Reduction/Phase III Demonstration System Preliminary Design (includes the CVC Engine, Inlet and Nozzle)

- Phase III: CVC Engine, Inlet and Nozzle Fabrication and Demonstration/Phase IV Demonstration System (Including CVC Engine, Turbine Engine, Inlet and Nozzle) Preliminary Design
- Phase IV: Full Scale Vulcan Demonstration System Detailed Design, Fabrication and Demonstration

DARPA is soliciting proposals covering all four phases. During each phase, DARPA will provide updated guidance and performers will have an opportunity to update their proposal for the following phase. Funding decisions for subsequent phases will be based on a proposal update at the end of each Phase, the satisfaction of programmatic and technical go/no-go criteria, and availability of funds, among other considerations.

DARPA is interested in full demonstration system solutions. Technology developers with expertise in specific component areas are encouraged to team with an overall system developer.

This is a program intended to develop and demonstrate a propulsion system but due to the integrated nature of airframe and propulsion systems on hypersonic vehicles, DARPA expects that teams will include aircraft design expertise.

## **B. Program Goals**

The Government is seeking an end-to-end demonstration of a Vulcan engine system. The program goals are to: 1) develop a robust system design that meets the performance objectives stated in this solicitation and is applicable to full scale hypersonic vehicles; 2) identify and mature critical enabling technologies; and 3) validate through simulation and direct connect testing a Vulcan engine that meets the goals stated in this solicitation.

The Government's envisioned concept for the Vulcan engine system architecture consists of: (i) a CVC Engine - using either PDE, CDE or other CVC engine architecture; (ii) a Turbine Engine - using an existing, production engine from the following list: the F100-229, F110-129, F119 or F414; (iii) a Flow Path Switching Inlet to control airflow between the CVC engine and turbine; (iv) a Flow Path Switching Nozzle to control exhaust airflow between the turbine and CVC engine; and (v) turbine cocooning to protect the turbine from temperatures and pressures above the design of the engine that will occur during CVC only operations.

The desire is for the turbine and CVC systems to share a common inlet and nozzle. It is also desired to shut down and isolate the turbine above the turbine's maximum operating Mach number. One of the key goals of the Vulcan program is to use full scale, production, Mach 2+ capable turbine engines with minimal modification, thus avoiding the need to develop a Mach 4+ turbine engine.

DARPA plans an incremental demonstration approach. Phase II will be comprised of all the component and subsystem risk reduction required to validate feasibility of the proposers' design. In Phase III, a full scale demonstration of a CVC engine, flow path switching inlet and flow path switching nozzle will be conducted to validate performance capabilities of the CVC portion of

the Vulcan system. In Phase IV, the Phase III demonstration system will be integrated with the turbine engine and a full scale demonstration will be conducted to validate performance of the Vulcan engine and the flow path switching inlet and nozzle in all three operating modes. For cost reasons, DARPA does not currently envision demonstration of turbine cocooning during this program; however demonstrated designs must show traceability to the operational Vulcan system design. Likewise the vehicle level air induction system will not be demonstrated, however the inlet conditions ahead of the Vulcan engine inlet face must be derived from the Vulcan operational system design as it would be integrated into an airframe.

DARPA has established the following non-tradeable requirements for the Vulcan system:

- A CVC engine(s) will be developed as an element of the Vulcan engine
- An existing production Turbine Engine will be another element of the Vulcan engine
  - Must use an existing, production engine from the following list: the F100-229, F110-129, F119 or F414. A Government provided, General State-of-the-Art Generic Engine Description may be requested by sending an email to: [BAA08-53@darpa.mil](mailto:BAA08-53@darpa.mil)
- Notional uninstalled thrust for the hypersonic vehicle is to be provided by one or more Vulcan engines and must be greater than the values outlined in Figure 1
- Notional vehicle flight path to be met or exceeded on a trajectory to Mach 4 is outlined in Figure 2
- CVC engine must be able to operate on fuel qualified for the turbine engine and must at least be capable of throttling between half and full power
- Design must include a Turbine Engine cocooning architecture and restart capability
- Full scale Vulcan engine must be capable of:
  - Demonstrating in three modes with continuous operation between Mach 0 to 4+: Turbine only, Turbine & CVC engine, and CVC engine only
  - Demonstrating an efficient combined inlet architecture
  - Demonstrating an efficient combined nozzle architecture

<b>Mach Number</b>	<b>Vulcan Uninstalled Thrust (lbs)</b>	<b>Turbine Uninstalled Thrust (lbs)</b>	<b>CVC Uninstalled Thrust (lbs)</b>
0	80,000	80,000	-
1.5	90,000	80,000	10,000
2.0	70,000	60,000	10,000
3.0	50,000	-	50,000
4.0	50,000	-	50,000

Figure 1. Total Uninstalled Thrust Curve for Notional Hypersonic Vehicle

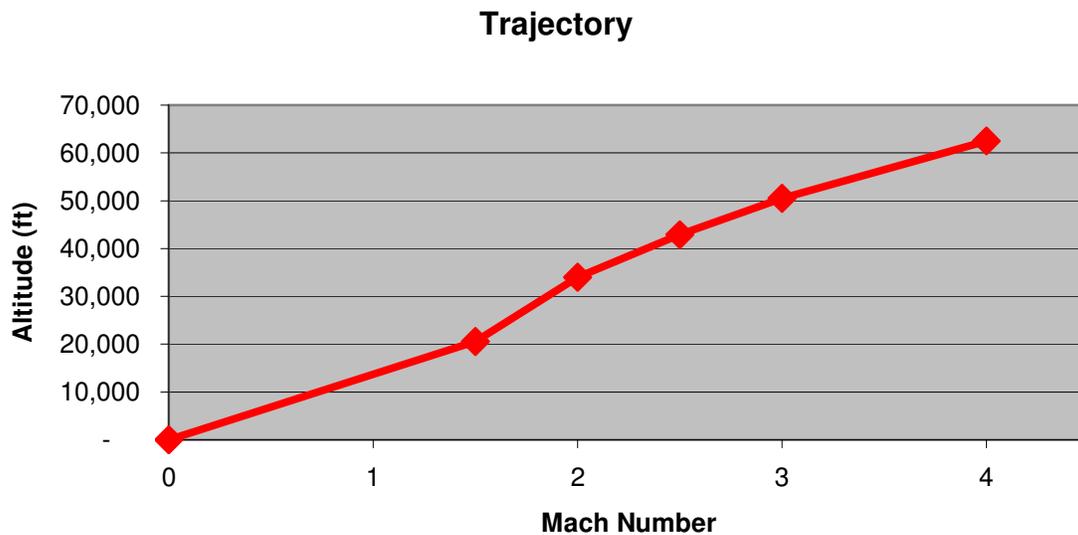


Figure 2. Flight Trajectory of Notional Vehicle to maintain ( $Q = 1,500 \text{ lb/ft}^2$ )

The Vulcan program will be conducted in four phases. During Phase I, performers will develop a Critical Technology Development Plan (CTDP) that provides a detailed plan for maturing all the components and subsystems needed for the proposer’s particular Vulcan engine design, development of an engine performance model and deliver a final conceptual design. In Phase II, performers will complete additional design work and component risk reduction testing culminating in Preliminary Design Review (PDR) of the CVC engine portion of the system (including flow switching inlet and nozzle). Phase III will carry out system integration risk reduction activities and complete design, fabrication and testing of the CVC engine. It is envisioned that these Phase III demonstrations will include an inlet flow path switching demonstration at conditions that simulate the conditions expected in the Vulcan engine inlet duct, a nozzle flow path demonstration at engine operating free stream conditions, and a successful full scale CVC engine operating demonstration. In parallel, performers will also complete preliminary design of the full scale Vulcan demonstration engine. In Phase IV performers will conduct detailed design, fabrication and demonstration of a fully integrated, unmodified or minimally modified turbine engine with the full scale CVC engine and flow path switching inlet and nozzle in a direct connect wind tunnel demonstration, validating the ability to achieve the thrust predicted by simulation of the Vulcan engine performance.

Each phase will progressively mature the design and technologies required to validate the ability to achieve the Vulcan demonstration system performance goals and move incrementally toward an operational system. The following sections describe the specific technical objectives of each phase.

### **C. Phase I Objectives**

The objectives of Phase I are to: 1) develop system requirements for an operational Vulcan engine system, 2) develop system requirements and a conceptual design of a CVC demonstration engine, flow path switching inlet, and nozzle including doors in the architecture to close all flow

to the turbine during cocooning; 3) develop a Critical Technology Development Plan (CTDP) for all technical risk reduction required for the Vulcan Engine; and 4) generate a preliminary engine performance model. More detail on each of these objectives is provided in the following paragraphs. A detailed description of the Phase I schedule and deliverables appears in Section D.

***i. Vulcan System Requirements Development***

Proposers shall submit a notional Vulcan demonstration engine system design with their proposals. During Phase I, proposers will conduct more rigorous air vehicle integration and technology trades about the non-tradeable requirements and derive/identify additional system level requirements and functions to develop final Vulcan system requirements and ensure an optimized system design. Examples of additional system level requirements and functions at a minimum would include thrust to weight, thrust to airflow, thrust to area, thrust to specific fuel consumption and installed losses. These system level requirements will then be allocated to the segment level – e.g., Vulcan inlet, Vulcan nozzle, CVC engine, turbine engine, etc. For example, this design should include an air induction system appropriate for a hypersonic vehicle airframe design and sufficient analysis should be conducted to define the inlet flow conditions for the Vulcan system.

Proposers shall implement a rigorous process to document trade study results as well as derive and track requirements and design decisions as the design matures to ensure a robust system level design. This design must have direct traceability to the Vulcan operational system and be capable of meeting the Phase IV demonstration requirements. A final design deliverable for Phase I will be a System Requirements Review that defines the Vulcan demonstration system design and system requirements to be tested in Phase IV. The SRR information will form the basis for deriving the technical objectives of the subsystem level requirements and demonstrations to be conducted in Phase III and be capable of supporting the integration of components into subsystems.

***ii. System Requirements Review (SRR) of the CVC Engine***

Based on the Vulcan system design developed above, proposers shall conduct further design work on the CVC demonstration engine, inlet and nozzle to be tested in Phase III. This design must have direct traceability to the Vulcan system design and be capable of meeting the Phase III demonstration requirements. A deliverable at the final review for Phase I will be a System Requirements Review that defines the Phase III demonstration system design and system requirements. The SRR information will form the basis for deriving the technical objectives of the component level tests and demonstrations to be conducted in Phase II.

***iii. Final Critical Technology Development Plan***

Proposers shall submit an initial Critical Technology Development Plan (CTDP) in their proposal that provides an initial description of all the required risk reduction activities to enable the Phase III Demonstration Systems and a full Vulcan system demonstration in Phase IV. This CTDP will be finalized at the completion of Phase I in conjunction with SRR. The final CTDP will provide an integrated basis for all risk reduction activities that will be performed during Phases II-IV. The CTDP will 1) identify and assess critical technologies that constitute the major technical and system integration risks on the program; 2) identify major risk reduction

tests and demonstrations required to validate the ability to achieve the Vulcan engine performance and demonstration goals in Phases III and IV; 3) define credible intermediate performance objectives (success metrics) associated with each of these critical tests and demonstrations.

*iv. Preliminary Engine Performance Model*

During Phase I the performer should develop a performance model for the Vulcan System Design. The performance model should include the entire Vulcan engine and at a minimum include subsystems for the CVC engine cycle, Turbine engine cycle, Inlet and Nozzle. As part of Phase I this model will be used to define performance goals for component and subsystem testing that will be completed as part of Phase II. This model shall also be used to generate a performance comparison between a pure ramjet and the CVC cycle. This initial model should continue to be refined and validated as the program progress and the details of the design are refined. Simulation of the Vulcan engine at different operating conditions and output levels will be performed using this model to create performance predictions prior to testing. This model should continue to be used to verify that the Vulcan engine design meets or exceeds the performance metrics to meet the Go\No Go criteria at the end of each phase.

**D. Phase I Schedule and Deliverables**

Phase I will be an 8 month effort. DARPA intends to hold a kickoff meeting at award, an interim design review 3 Months After Award (MAA), and final review 6-months after award at the performer's facility. Between formal program reviews, DARPA desires monthly program status teleconferences to update the government team on significant progress or setbacks to the program and a general status update in the major technical areas. The performer shall also capture the progress on the program in monthly submissions of written Technical and Financial Reports. The final review shall include the following deliverables; the SRR of the Vulcan System, SRR of the Phase III demonstration system, final CTDP, Vulcan engine models and update to the Phase II program plan. Based on the results of the Phase I final review, the performers shall provide a written Phase II proposal update due 7 months after award and their final report shall be due 8 months after award.

A description of each deliverable is provided in the following sections:

*i. Interim Design Review (3 MAA)*

At the interim design review the performer shall provide design updates that reflect an increasing level of design fidelity as the results of increased understanding of the requirements, trade studies being performed and improved fidelity of modeling of the Vulcan engine system. Proposers should provide sufficient information at the design reviews to substantiate that adequate progress is being made toward achieving Phase II go/no go criteria. At the Interim review progress shall be updated on trade studies, CTDP and system design.

*ii. Monthly Technical and Financial Reports*

Reports shall contain enough technical and financial information for the government team to be able to assess progress, provide feedback and stay abreast of any emerging technical, cost or schedule issues. The report should update the government team with a list of important

activities, significant progress or setbacks to the program and a general status update in the major technical areas based on the activity scheduled for the previous month. The report should include a list of major activities that will occur in the following month and a projection of funding for the program.

***iii. System Requirements Review of Vulcan System (6 MAA)***

The proposer shall conduct an SRR to describe the system level requirements and functions necessary to achieve their predicted Vulcan system performance. The requirements should have direct legacy to the non-tradeable requirements and Phase I trade study results. These system and functional requirements shall be decomposed and allocated as appropriate to the segments of the Vulcan system architecture to develop performance metrics for each segment. An SRR will be conducted to assess the maturity of the design and readiness to proceed into Phase II. At this review the government will evaluate the progress, technical adequacy, and risk of the Vulcan demonstration system design; and assess its compatibility with demonstration performance requirements and the demonstration objectives of the CTDP.

This review should also describe the process that produced the system requirements products. Specific review items are as follows:

- Functional Flow Analysis
- Requirements & Requirements Allocation
- Trade Study Results
- Integrated Test/Lab Demonstration Planning including identification of appropriate test facilities for all demonstrations
- Vulcan Engine Design Concept
  - Block diagram
  - Schematics
  - 3D CAD physical layout
  - Weight estimate/budgets
  - System specification
  - System integration approach
- Engine Performance Assessment – Evaluate Vulcan engine performance traced to notional vehicle operation.
- Phase II Systems Engineering
  - Process
  - Organization
  - Configuration management

***iv. System Requirements Review (SRR) Phase III Demonstration System (6 MAA)***

The proposer shall conduct an SRR to describe the system level requirements and functions necessary to achieve their predicted CVC engine, inlet and nozzle performance. The requirements should have direct legacy to the Vulcan system design. These Phase III demo system requirements and functions shall be decomposed and allocated as appropriate to various components of the Phase III demo system architecture to develop performance metrics for

subsystems and components. These in turn will be used to establish quantified values for the success criteria for all of the risk reduction events in the Phase II.

Specific review items are as follows:

- Functional Flow Analysis
- Requirements & Requirements Allocation
- Trade Study Results
- Integrated Test/Lab Demonstration Planning including identification of appropriate test facilities for all demonstrations
- CVC Engine Design Concept
  - Block diagram
  - Schematics
  - 3D CAD physical layout to the component level
  - Weight estimate/budgets
  - Software architecture
  - System specification
  - System integration approach
- Phase III Demo System Performance Assessment – Evaluate performance traced to Vulcan system design.

**v. *Final CTD*** (6 MAA)

The proposer shall finalize their CTD in conjunction with SRR. The CTD will serve as the roadmap for executing the remainder of the program. The final CTD should show how each of the planned events has traceability to the overall system level performance requirements. In particular, this review should focus on substantiating how the planned risk reduction activities will validate the ability to meet system level performance requirements. The review encompasses the total system requirements, including, combustor, initiator, compressor, seals, packaging, engine control software, preliminary logistic support considerations and other items as required by the proposed CVC engine design. The review should also address technical challenges for the integration of the production turbine for testing, Flow Path Switching Inlet, Turbine Cocooning and the Flow Path Switching Nozzle to include any risk reduction testing required in Phase II. The final CTD shall include:

- Risk management and mitigation planning
- Risk assessment
- System/segment risk waterfalls
- Test and demonstration quantifiable success metrics
- Technical Performance Metrics
- Phase II-IV Master Demonstration Schedule

**vi. *Engine Performance Model*** (6 MAA)

The performance model should include the entire Vulcan engine and at a minimum include subsystems for the CVC engine cycle, Turbine engine cycle, Inlet and Nozzle. The model should also include a pure ramjet that can be substituted for the CVC portion of the cycle to allow for performance comparisons between a ramjet and a CVC cycle. As part of the proposal the performer should describe the background, methodology, development and validation

approach planned for the model in the program and process for documentation that will be performed for the modeling. The background of the model should discuss the previous modeling tools that will be used or adapted for this program for CVC engine cycle modeling and if the models are empirical, based on scale testing or at the scale required for the Vulcan engine. An explanation of the tools and process that will be used by the performer for model development and validation should show strong system engineering processes. The model should be at the necessary level of fidelity that is equivalent to the maturity of the design. Outputs of this model will be used to verify that the Vulcan engine design meets or exceeds the performance metrics to meet the Go/No Go criteria at the end of phase I and II.

***vii. Vulcan Models (6 MAA)***

At the final review the performer shall deliver to the Program Manager four (4) sets of SLA scale models of the proposed Vulcan engine based on the design at the CoDR.

At the final review the performer shall deliver to the Program manager a computer animation that represents the notional operation of the Vulcan engine from Mach 0-4+ to help illustrate the operation and interaction of the CVC engine, turbine engine and the flow path switching inlet and nozzle.

***viii. Phase II Program Plan (6 MAA)***

The proposer's Phase II program plan shall provide an overview of the proposer's planned Phase II proposal. The Phase II program plan shall occur at the 6 month review and at a minimum it shall include a presentation of the Phase II master demonstration schedule showing all key events, their sequencing and their timing; a description of the technical objectives and success criteria of each demonstration; Phase II organization chart and staffing plan; and an updated ROM Phase II cost to at a minimum WBS level 3 detail, including ROM cost for each major demonstration/risk reduction event..

***ix. Phase II Proposal (7 MAA)***

The proposer's Phase II proposal shall consist of the Phase I final review deliverables, an updated Phase II Statement of Work, Integrated Master Schedule and Cost Estimate to Work Breakdown Structure (WBS) Level 4 detail, and an updated management and staffing plan. Each test and demonstration must be a uniquely described and priced WBS element. Proposers should use the same WBS established with the Phase I proposal and this WBS should be used to link the IMS and cost. With this proposal the performer shall provide an update to the Phase III program plan to WBS level three and Phase IV program plans to WBS level two.

***x. Final Report (8MAA)***

At the conclusion of Phase I of the program, the performer shall document the technical tasks performed under the program in a final written report. The document at a minimum shall contain a documentation of the SRR, CTDP, documentation of the assumptions in the Vulcan engine performance model and latest Vulcan system design. A Final Report will be provided at the end of each Phase regardless of whether the performer is awarded a next Phase.

**E. Phase II Objectives**

The Government intends to provide guidance after the interim design review and request a Phase II proposal due 7 months after award. The decision to continue the program into Phase II will be based upon the Government's determination that one or more proposers have successfully met the Phase II technical go/no go criteria described in Section H on page 14, evaluation of the Phase II proposals, the availability of Phase II funds, and other programmatic considerations.

In Phase II, the proposer shall begin execution of the CTDTP completed in Phase I. It is envisioned that risk reduction testing during Phase II would primarily include component/subsystem testing on test rigs at operating and flow conditions representative of the Vulcan system. These activities should address key risk items such as combustion tubes, valves, nozzles, seals, controls, materials, TMS, inlets, nozzle, materials, turbine cocooning or other identified technical challenges specific to the performer's particular Vulcan system design. It is envisioned that by the end of Phase II the performer will have reduced all of the technical risks of the components and subsystems through integration and testing in a representative environment (technology readiness level 5) so that only system integration risks exist in Phase III.

In parallel, the proposer shall continue to refine the conceptual design of their Phase III demonstration system, culminating in a Preliminary Design Review (PDR). At PDR, the CVC engine, inlet and nozzle should be put under formal configuration control. The proposer shall also continue design refinement of the Vulcan system design based on the results of Phase II risk reduction activities and the evolving CVC engine, inlet and nozzle designs.

DARPA will provide guidance and request a Phase III proposal update during Phase II.

Proposers should propose a schedule appropriate for the design maturity and risk reduction required for their Vulcan engine demonstration system concept. In general, DARPA desires quarterly program reviews at the contractor's facility. The objective of these reviews will be to assess progress, provide feedback and stay abreast of any emerging technical, cost or schedule issues. Proposers shall include a detailed list of deliverables to be provided at each quarterly review, along with associated accomplishment criteria. During months without program reviews, DARPA desires program status teleconferences to update the government team on significant progress or setbacks to the program and a general status update in the major technical areas based on the activity scheduled for the previous month. The performer shall also capture the progress on the program in monthly submission of written Technical and Financial Reports. To successfully achieve the Phase III go/no go criteria, DARPA has developed a minimum list of events/deliverables that must be included in the proposer's Phase II program. Each of these items must be reported at a program review, but the sequencing and relative timing is left to the proposers.

The following events/deliverables must be included as part of the proposer's review schedule.

- Monthly Technical and Financial Reports
- Interim Design Reviews (quarterly prior to PDR)
- Results of major component tests and demos as identified in proposal Critical Technology Development Plan (NLT 3 months after completion of each major event)
- PDR of Phase III Demonstration System

- Phase III Proposal Update
- Final Report

***i. Monthly Technical and Financial Reports***

Reports shall contain enough technical and financial information for the government team to be able to assess progress, provide feedback and stay abreast of any emerging technical, cost or schedule issues. The report should update the government team with a list of important activities, significant progress or setbacks to the program and a general status update in the major technical areas based on the activity scheduled for the previous month. The report should include a list of major activities that will occur in the following month and a projection of funding for the program.

***ii. Interim Design Reviews***

Throughout Phase II, the proposer shall provide periodic updates for both the Phase III Demonstration System and the overall Vulcan system designs. These design updates should reflect an increasing level of design fidelity in both designs as the results of risk reduction activities impact the design. Specifics and timing of deliverables to be included at each review are left to the proposer, however proposers should provide sufficient information to substantiate that adequate progress is being made toward achieving Phase III go/no go criteria.

***iii. Results of Major Component Tests and Demonstrations***

At each quarterly review, the proposer shall review the results of any risk reduction activities conducted since the prior review. This review shall provide a comparison of test results to pre-test performance predictions/component performance objectives as well as the success criteria established in the CTDP. If test results produce results that are deemed to be unsuccessful, the proposers shall describe fall-back plans, which can include but are not limited to redesign, revise instrumentation and others, for addressing the deficiency.

***iv. Preliminary Design Review (PDR) of the Phase III Demo System***

A PDR will be conducted to assess the maturity of the design and readiness to proceed into detailed design. At this review the government will evaluate the progress, technical adequacy, and risk of the Phase III demonstration system design; assess its compatibility with Vulcan performance requirements and the demonstration objectives of the CTDP; evaluate the degree of definition and assess the technical risk associated with Phase III demonstration system design; and establish the existence and compatibility of the physical and functional interfaces. For software items, the government will evaluate the progress, consistency and technical adequacy of the design and test approach, and compatibility between software requirements, test requirements and the preliminary design. Following PDR, the design should be sufficiently complete that it can be put under formal configuration control. Specific PDR objectives are as follows:

- Verify functional, performance and interface design requirements for subsystem and configuration items to enable execution of the CTDP
- Verify the Phase III demonstration system design is sufficient and ready to be put under configuration control
- Review and evaluate the maturity of the software requirements
- Define Item Performance Specifications including software-related items
- Define the draft item detail, process, and material specifications

- Evaluate the design data defining major subsystems, equipment, software, and other elements
- Review results of risk reduction activities

*v. Phase III Proposal*

The Phase III proposal shall consist of the Phase II PDR deliverable, an updated Phase III Statement of Work. Integrated Master Schedule and Cost Estimate to WBS Level 4 detail and an updated management and staffing plan. Proposers should use the same WBS established with the Phase I proposal and this WBS should be used to link the IMS and cost. With this proposal the performer shall provide an update to the Phase IV program plan to WBS level three.

*vi. Final Report*

At the conclusion of Phase II of the program, the performer shall document the technical tasks performed under the program in a final written report. The document at a minimum shall contain a documentation of the Major Component Tests and Demonstrations, an update to the performance model and PDR of the Phase III Demo System. The Final Report will be provided at the end of each Phase regardless of whether the performer is awarded a next Phase.

**F. Phase III Objectives**

The decision to continue the program into Phase III will be based upon the Government's determination that one or more proposers have successfully achieved the Phase III technical go/no criteria, evaluation of the Phase 3 proposals, the availability of Phase III funds, and other programmatic considerations. The top level objective will be to complete detailed design, fabrication and demonstration of the CVC engine, as well as the flow path switching inlet and nozzle. Phase III activities should be detailed in the proposers CTDP. In addition, the proposer will complete PDR of the Vulcan system in Phase III. DARPA will provide guidance and request a Phase IV proposal during Phase III.

**G. Phase IV Objectives**

The decision to continue the program into Phase IV will be based upon the Government's determination that one or more proposers have successfully achieved the Phase IV technical go/no criteria, evaluation of the Phase 4 proposals, the availability of Phase IV funds, and other programmatic considerations. The top level objective will be to complete detailed design, fabrication and demonstration of the full Vulcan system. Turbine cocooning does not need to be demonstrated in Phase IV and proposers can use additional cooling fluids and thermal management for the Phase IV demonstration test. Phase IV must complete the demonstration objectives provided in Section B. It is envisioned that the Vulcan engine would be demonstrated in a series of tests that simulate the flow at operating conditions to the Vulcan inlet and cover a range of test points that are representative of a hypersonic vehicle flight envelope. This demonstration sequence will represent a proof of concept demonstration of the Vulcan engine in an operational environment. Innovative testing options are encouraged and may include but are not limited to ram air test facilities and other direct connect testing that will simulate the inlet air conditions at the Vulcan air inlet interface.

## **H. Go/No Go Criteria**

In order for the Government to evaluate the effectiveness of proposed solutions in achieving the stated program objectives, go/no go criteria have been established to measure whether program objectives have been met. These go/no go criteria will serve as the basis for determining whether satisfactory progress is being made to warrant continued funding of the program. The Government has identified these metrics with the intention of bounding the scope of the effort, while affording the maximum flexibility, creativity, and innovation in developing proposed solutions. The Government has defined the following go/no go criteria for Phases II, III and IV. The go/no go criteria for Phase II have been described in detail. As the design of the Vulcan engine and its subsystems mature in Phase II and III, the government team will work with the performers to create additional quantifiable metrics based on their designs.

The Go/No Go requirements for each of the phases shall be based upon meeting the non-tradeable requirements (listed in Section I.B on page 7) at the Vulcan engine system level. The way in which these criteria must be met will have increasing fidelity as the design matures.

### Phase II Go/No Go Criteria

- Final Phase IV Demonstration System Design meets the demonstration objectives and required performance curves in Figure 1 and 2 (on page 7 and 8) by simulation or analysis.
- Final CTDP identifies all Phase II-IV risk reduction activities and includes quantifiable success metrics for each test/demonstration
- Initial Vulcan engine performance model that can be used to generate engine performance adequate to meet the performance objectives.

### Phase III Go/No Go Criteria

- Component and Subsystem Testing results match performance requirements generated in Phase I modeling. PDR level design for the Phase III demonstration system complete and meets demonstration performance and Vulcan system level requirements
- Phase IV Demonstration System Design meets the demonstration objectives and required performance curves in Figure 1 and 2 (on page 7 and 8) based on experimental data from the component and subsystem testing in Phase II being used to update the performance model.

### Phase IV Go/No Go Criteria

- Flow Path Switching Inlet demonstration at operating conditions at full scale
- Flow Path Switching Nozzle demonstration at operating conditions at full scale
- Full Scale CVC Engine Test that validates the CVC engine cycle performance for the Vulcan Engine Demonstrator
- PDR level design for the Vulcan engine that closes about the non-tradeable requirements
- Phase IV Demonstration System Design meets the demonstration objectives and required performance curves in Figure 1 and 2 (on page 7 and 8) based on experimental data from the Phase III demonstration system testing being used to update the performance model.

## **II. AWARD INFORMATION**

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

The Government reserves the right to select for negotiation all, some, one, or none of the proposals received in response to this solicitation, and to make awards without discussions with proposers. The Government also reserves the right to conduct discussions if 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 proposer. The Government reserves the right to fund proposals in phases with options for continued work at the end of one or more of the phases.

Awards under this BAA will be made to proposers on the basis of the evaluation criteria listed below (see section labeled “Application Review Information”, Sec. V.), and program balance to provide best overall value to the Government. Proposals identified for negotiation may result in a procurement contract or other transaction agreement depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors.

## **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. Proposers are reminded that DARPA is only interested in full system solutions in response to this BAA. Technology developers with expertise in specific component areas are encouraged to team with an overall system developer.

Historically Black Colleges and Universities (HBCUs), Small Businesses, Small Disadvantaged Businesses and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals; however, no portion of this announcement will be set aside for these organizations' participation due to the impracticality of reserving discrete or severable areas of this research for exclusive competition among these entities. Independent proposals from Government/National laboratories 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. Proposers 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.

*i. 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.) Once the proposals have been received and prior to the start of proposal evaluations, the Government will assess whether any potential conflict of interest exists in regards to the DARPA Program Manager, as well as those individuals chosen to evaluate proposals received under this BAA. The Program Manager is required to review and evaluate all proposals received under this BAA and to manage all selected efforts.

The Program Manager is an employee of Draper Laboratories on extended assignment from Draper Laboratories to DARPA on an Intergovernmental Personnel Assignment (IPA), and is serving as a TTO Program Manager. He is on a two-year assignment through 05 June 2009. As such he is highly likely to have a conflict of interest with respect to proposals utilizing that institution as a performer. Proposers should carefully consider the composition of their performer team before submitting proposals to this BAA.

All Proposers and proposed subcontractors must affirm whether they are providing scientific, engineering, and technical assistance (SETA) or similar support to any DARPA technical office(s) through an active contract or subcontract. All affirmations must state which office(s) the Proposer supports and identify the prime contract numbers. Affirmations shall be furnished at the time of proposal submission. All facts relevant to the existence or potential existence of organizational conflicts of interest (FAR 9.5) must be disclosed. The disclosure shall include a description of the action the Proposer has taken or proposes to take to avoid, neutralize, or mitigate such conflict. In accordance with FAR 9.503 and without prior approval or a waiver from the DARPA Director, a Contractor cannot simultaneously be a SETA and Performer. **Proposals that fail to fully disclose potential conflicts of interests and/or do not have plans to mitigate this conflict will be returned without technical evaluation and withdrawn from further consideration for award.**

If a prospective Proposer believes that any conflict of interest exists or may exist (whether organizational or otherwise), the Proposer should promptly raise the issue with DARPA by sending Proposer's contact information and a summary of the potential conflict by email to the mailbox address for this BAA at [BAA08-53@darpa.mil](mailto:BAA08-53@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.

*ii. Cost Sharing and Matching*

Cost sharing is not required for this particular program; however, cost sharing will be carefully considered where there is an applicable statutory condition relating to the selected funding instrument (e.g., for any Other Transactions under the authority of 10 U.S.C. § 2371). Cost

sharing is encouraged where there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

## **IV. APPLICATION AND SUBMISSION INFORMATION**

### **A. Address to Request Application Package**

Proposers are required to review the Vulcan Program Security Classification Guide. To obtain a copy of the guide, proposers must send a request to the BAA mailbox, [BAA08-53@darpa.mil](mailto:BAA08-53@darpa.mil). This BAA along with the classification guide contains all information required to submit a proposal. No additional forms, kits, or other materials are needed. No additional information is available, nor will a formal Request for Proposal (RFP) or additional solicitation regarding this announcement be issued. Requests for same will be disregarded.

The following information needs to be submitted via the BAA mailbox to request the security classification guide:

- Company Name
- Mailing address
- Cage Code
- Facility Security Officer (FSO) name and phone number
- Technical POC name and phone number

### **B. Content and Form of Application Submission**

#### ***i. Proposal Information***

Proposers are required to submit proposals according to the instructions in Section IV.C on page 26. Selection remains contingent on availability of funds.

All administrative correspondence and questions on this solicitation, including requests for information on how to submit a proposal to this BAA, should be directed to [BAA08-53@darpa.mil](mailto:BAA08-53@darpa.mil) or send facsimiles marked with “DARPA/TTO, BAA 08-53” to (703) 696-8401. Frequently Asked Questions (FAQ) and other BAA related documents may be found on the BAA website: <http://www.darpa.mil/tto/solicitations.htm>. DARPA intends to use electronic mail and fax for correspondence regarding BAA 08-53. Proposals may **not** be submitted by fax or e-mail; any so sent may be disregarded. DARPA encourages use of the Internet for retrieving the BAA and any other related information that may subsequently be provided. See below for submittal instructions.

Proposals not meeting the format described in the BAA may not be reviewed.

It is the policy of DARPA to treat all proposals as competitive information and to disclose the contents only for the purposes of evaluation. The Government may use selected support contractor personnel to assist in administrative functions only. For this solicitation, non-

Government advisors, who have signed appropriate non-disclosure and conflict of interest statements, may assist in the proposal review when their assistance is required. However, they will not participate in the final source selection process.

Proposers are also advised that employees of commercial firms under contract to the Government may be used by DARPA agents to administratively process proposals, monitor contract performance, or perform other administrative duties requiring access to other contractors' proprietary information. These support contracts include nondisclosure agreements prohibiting their contractor employees from disclosing any information submitted by other contractors or using such information for any purpose other than that for which it was furnished. By submission of its proposal, each proposer agrees that proposal information may be disclosed to those non-Government personnel for the limited purposes stated above.

Proposers are advised that only contracting officers are legally authorized to contractually bind or otherwise commit the Government.

### ***ii. Proposal Format***

All proposals must be in the format given below. Nonconforming proposals may be rejected without review. Proposals shall consist of two volumes. Technical and cost proposals must be submitted as separate volumes (Volume I Technical, Volume II Cost) and must be valid for 160 days. All pages shall be formatted for 8-1/2 by 11 inch paper with type not smaller than 12 point. Smaller font may be used for figures, tables and charts. Volume I, Technical and Management Proposal, may include an attached bibliography of relevant technical papers or research notes (published and unpublished), which document the technical ideas and approach upon which the proposal is based. Copies of not more than ten (10) relevant papers can be included with the submission. The bibliography and attached papers are not included in the page counts given below. The submission of other supporting materials along with the proposals is strongly discouraged and will not be considered for review. Except for Sections I and VI, Volume I shall not exceed seventy-five (75) pages, which includes all figures, tables, and charts. All proposals must be written in English.

### ***iii. Volume I, Technical and Management Proposal***

The Volume I Technical Proposal shall be organized into eight sections as described below.

#### **Section I. Administrative (Not included in the page count)**

- A. Confirmation Sheet (as described above) will contain the following information:
- 1) Announcement number;
  - 2) Proposal title;
  - 3) Technical point of contact including: name, telephone number, electronic mail address, fax (if available), and mailing address;
  - 4) Administrative point of contact including: name, telephone number, electronic mail address, fax (if available), and mailing address;

- 5) 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;
  - 6) 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.
- B. Official transmittal letter.
  - C. Table of Contents. The Table of Contents should be keyed to the page numbers of the proposal sections.
  - D. Additional indexes/references such as List of Figures, List of Acronyms, etc. if desired.

## Section II. Executive Summary

The Executive Summary should provide a short overview of the proposer's proposed Vulcan program, including a summary of the initial Vulcan system concept, technical approach, and top-level description of tasks, schedule and cost for each phase.

## Section III. Vulcan System Design

The proposer should describe their Vulcan system architecture and the notional system concept that will serve as the starting point for conceptual design in Phase I. This top level vision should be substantiated with first order analysis consistent with this level of design maturity. This is meant to be an initial look that demonstrates the proposer understands the Phase II Go/No Go criteria, program objectives, performance goals and operational issues. The proposer will describe its top level system vision, major subsystems, and critical technologies integral to achieving its predicted system performance and provide a discussion for the how they intend to measure the achievement of the Go/No Go criteria. In the proposal there should be a discussion of the planned methods, tools, validation and documentation for the development of the Vulcan engine performance model including the past history of modeling CVC and other unsteady cycles. This design is the starting point for the trades which will be done in Phase I. The Government does not expect this initial design to be defined to high fidelity; however at a minimum the proposer shall substantiate the feasibility of this design to be able to meet the program objectives and go/no go criteria.

The Phase I SOW will describe all of the tasks the proposer will perform in order to achieve the Phase I exit criteria. The proposer shall define a program WBS that shall be used throughout the program. The Phase I SOW, IMS and cost estimate shall all be organized in accordance with this WBS and use a common numbering system. The Phase I SOW shall be defined to WBS Level 4 at a minimum; the proposer may choose to define work at lower levels to better explain its approach. Proposers are not required to have SOW entries for each WBS element – only those that contain work during Phase I. The Phase I IMS should provide a detailed, integrated schedule of all activities in Phase I and all tasks in the IMS shall be linked with the ability to

implement the display the critical path. An electronic copy of the IMS in MS Project shall be included on the CD proposal submittals.

#### Section IV. Overall Scientific Approach

This section provides the detailed discussion of the proposer's specific technical approach to achieving the Vulcan program objectives. This section should describe the overall analysis plan, methodology, system engineering tools, and modeling and simulation tools to be used in the execution of the program. In particular, the proposer shall describe their proposed approach for developing and validating an engine performance model in Phase I. Proposers should highlight their methods and abilities for decomposing top-level system requirements down to the segment and component level to allocate margin as appropriate to various components of the system to achieve their predicted top-level performance with direct legacy to the operational Vulcan engine design.

This section should also include the proposers initial CTDP. This CTDP shall provide an initial list of critical technology risk areas and risk reduction approaches. The process should describe a building block approach to incrementally reduce risk through analyses, simulation, and component and full scale demonstrations in each critical risk area that will achieve Phase II, III and IV program objectives. The proposer shall describe candidate test facilities to be used for the Phase III and IV demonstrations as well as any other unique demonstrations. The proposer should also describe the process for identifying and evaluating applicable technologies available from other Government and industry R&D programs.

The proposer's Phases II program plan shall include a statement of work and ROM cost estimate detailed to WBS Level 3 based on the proposer's initial CTDP. The Phase III and IV Program Plans shall include top-level schedules for each phase, detailed to WBS Level 2, based on the proposer's initial CTDP.

This section will also describe the proposer's proposed management process and demonstrate the team's qualifications to conduct all phases of the Vulcan program. In particular, the proposer should describe its management construct and corporate capabilities; program team and key personnel; past relevant experience; and approach to intellectual property. The proposer should describe its program management process, including a description of how the team will function and share technical and financial information among the team members and with the Government. The proposer should address corporate capabilities and facilities available across the team.

The proposer should describe the proposed program team and demonstrate the team's capability to perform all phases of the Vulcan program. Short resumes shall be provided for the Program Manager, Chief Engineer, CVC Engine Design Lead, Inlet and Nozzle Design Lead and lead personnel in key disciplines. The proposer shall identify the number of hours committed for each of these key personnel in Phase I.

Finally, the proposed approach to intellectual property rights should include a discussion of the proposer's previous accomplishments, work in this area or closely related research areas and a

list of technical data, computer software, and computer software documentation associated with this research effort in which the Government will acquire less than unlimited rights. This discussion should include a list of patent rights, including necessary background inventions and licenses thereto and supporting rationale of why this approach to intellectual property offers the best value to the Government.

#### Section V. Innovativeness of the Design and Relevance to the DARPA mission

This section will describe the innovative aspects that will be utilized in the proposers design for the Vulcan engine. This shall include any unique architecture, methods or revolutionary research that will advance the approach to high speed propulsion through the combination of constant volume combustion with a minimally modified turbine engine for missions of relevance to DARPA TTO. The focus should be on how the Vulcan engine offers potential contributions with significance to national technology and specifically, DARPA's mission. The proposer shall discuss how the innovative design aspects of their Vulcan engine designs will be matured inside the program to bridge the gap between fundamental discoveries and military use of the technology to the extent that the proposer can discuss how the Vulcan demonstration system will be the solution to the challenges presented by the program goals. Those goals being that the Vulcan engine designed in this program have traceability and compatibility for integration into a hypersonic vehicle design with significant military utility by meeting the proposer hypersonic vehicle trajectory containing a Vulcan engine.

#### Section VI. Additional Information (Not included in the page count)

A brief bibliography of relevant technical papers and research notes (published and unpublished) which document the technical ideas upon which the proposal is based. Copies of not more than ten (10) relevant papers can be included in the submission. These papers are not included in the seventy-five page limit.

#### *iv. Volume II, Cost Proposal – {No Page Limit}*

a) Cover sheet to include:

- (1) Must include the words "Cost Proposal";
- (2) BAA number;
- (3) Funds requested from DARPA for the Base Effort, each option and the total proposed cost;
- (4) Lead Organization submitting proposal;
- (5) Type of business, selected among the following categories: "LARGE BUSINESS", "SMALL DISADVANTAGED BUSINESS", "OTHER SMALL BUSINESS", "HBCU", "MI", "OTHER EDUCATIONAL", OR "OTHER NONPROFIT";
- (6) Contractor's reference number (if any);
- (7) Other team members (if applicable) and type of business for each;
- (8) Proposal title;

- (9) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available);
- (10) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), and electronic mail (if available);
- (11) Award instrument requested: cost-plus-fixed-fee (CPFF), cost-fee — no fee, cost sharing contract – no fee, or other type of procurement contract (*specify*);
- (12) Place(s) and period(s) of performance;
- (13) Total proposed cost separated by basic award and option(s) (if any);
- (14) Name, address, and telephone number of the proposer's cognizant Defense Contract Management Agency (DCMA) administration office (*if known*);
- (15) Name, address, and telephone number of the proposer's cognizant Defense Contract Audit Agency (DCAA) audit office (*if known*);
- (16) Any Forward Pricing Rate Agreement, other such Approved Rate Information, or such other documentation that may assist in expediting negotiations (if available);
- (17) All subcontractor proposal backup documentation to include items (1) through (12) above, as is applicable and available;
- (18) Date proposal was prepared;
- (19) Dun and Bradstreet (DUN) Number;
- (20) Taxpayer Identification Number (TIN);
- (21) Contractor and Government Entity (CAGE) Code;
- (22) Subcontractor Information; and
- (23) Proposal validity period.

b) Detailed cost breakdown in MS Excel in accordance with guidance provided in Appendix A at <http://www.darpa.mil/tto/solicitations.htm>. Appendix A contains specific table formats and instructions for providing summary cost information. Use of this format is required to facilitate timely Government evaluation of the proposal.

c) 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 proposer is seeking a procurement contract award of \$650,000 or greater unless the proposer requests an exception from the requirement to submit cost of pricing data. "Cost or pricing data" are not required if the proposer proposes an award instrument other than a procurement contract (e.g., other transaction agreement.) All proprietary subcontractor proposal documentation (prepared at the same level of detail as that required of the prime) should be submitted with the proposal.

d) All proposers requesting an 845 Other Transaction Agreement for Prototypes (OTA) must include a detailed list of payment milestones. Each such payment milestone must include the following: milestone description, exit criteria, due date, milestone payment amount (to include, if cost share is proposed, contractor and government share amounts). It is noted that,

at a minimum, such payable milestones should relate directly to accomplishment of program technical go/no-go criteria as defined in the BAA and/or the proposer's proposal. Agreement type, fixed price or expenditure based, will be subject to negotiation by the Agreements Officer; however, it is noted that the Government prefers use of fixed price payable milestones to the maximum extent possible. If the proposer requests award of an 845 OTA as a nontraditional defense contractor, as so defined in the OSD guide entitled "Other Transactions (OT) Guide For Prototype Projects" dated January 2001 (as amended)([http://www.dau.mil/pubs/Online\\_Pubs.asp](http://www.dau.mil/pubs/Online_Pubs.asp)), information must be included in the cost proposal to support the claim. Additionally, if the proposer plans requests award of an 845 OTA, without the required one-third (1/3) cost share, information must be included in the cost proposal supporting that there is at least one non-traditional defense contractor participating to a significant extent in the proposed project.

### **C. Submission Dates and Times**

Proposals, the UNCLASSIFIED technical and cost volumes, must be submitted in hard copy, with one signed original and ten copies, plus two electronic copies on CD-ROMs. Each copy must be clearly labeled with BAA 08-53, proposer organization, proposal title (short title recommended), and Copy x of 10. Facsimile or electronic submissions will not be accepted. If the proposer elects to include a CLASSIFIED Addendum, they are encouraged to let DARPA know as soon as possible and be aware that the Addendum must be submitted to DARPA separately from the UNCLASSIFIED volumes per instructions found in Section V.B.ii All parts of the proposal must be submitted to DARPA on or before 4:00 p.m., local time, 15 September 2008, in order to be considered during the initial round of selections; however, proposals received after this deadline may be received and evaluated up to one year from date of posting on FedBizOpps. Proposals submitted after the due date specified in the BAA may be selected contingent upon the availability of funds.

DARPA will post a consolidated Question and Answer response after August 29, 2008, before final full proposals are due. In order to receive a response to your question, submit your question by August 22, 2008 to [BAA08-53@darpa.mil](mailto:BAA08-53@darpa.mil).

**BAA 08-53 will remain open for a period of one year, 30 JULY 2008 through 29 JULY 2009.** Proposals may be submitted at any time from issuance of this announcement through 1200 noon (ET), 29 JULY 2009; however, proposers 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.

## V. APPLICATION REVIEW INFORMATION

### A. Evaluation Criteria

Evaluation of proposals will be accomplished through a scientific/technical review of each proposal using the following criteria: (1) Ability to meet Program Go/No-Go Metrics; (2) Overall Scientific and Technical Merit; (3) Potential Contribution and Relevance to the DARPA Mission; (4) Cost Realism. The first two criteria will have equal weight, while the next two criteria will carry a lesser weighting and are listed in descending order of importance. These evaluation criteria are detailed in the following sections. The bulleted lists under individual factors are specific areas of evaluation which will be assessed in conjunction with these criteria.

#### *i. 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 program 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.

- Extent to which the proposer's Vulcan system concept meets the program objectives, system requirements and performance goals based on the Go/No Go criteria as listed in Section I.H on page 17. Evaluation will primarily focus on the Phase II Go/No Go Metrics. Phase III and IV Metrics should be provided with sufficient detail to show closed system solutions.
- Extent to which the proposer's Vulcan system conceptual design meets the Go/No Go criteria is substantiated via analysis or previous experimental work.
- Extent to which proposed engine performance model has sufficient level of fidelity and statistical confidence in assessing design performance capabilities and ability to meet the Go/No-Go criteria
- Phase I SOW details activities to WBS Level 4, is traceable to the IMS tasks and the Cost Proposal detailed estimates, and has all proposed deliverables clearly defined such that the final product achieves the Phase I program objectives and satisfies the Phase II Go/No-Go Metrics listed in Section 1.H on page 17.

#### *ii. Overall Scientific and Technical Merit*

The proposed technical approach is feasible, achievable, complete and supported by a proposed technical team that has the expertise and experience to accomplish the proposed tasks. Task descriptions and associated technical elements provided are complete and in a logical sequence with all proposed deliverables clearly defined such that a final product that achieves the goal can

be expected as a result of award. The proposal identifies major technical risks and planned mitigation efforts are clearly defined and feasible.

- The extent to which the design offered by the performer shows an innovative approach to solving the challenges presented by the program goals.
- Initial Critical Technology Development Plan
  - The CTDP identifies the major technical risks for the proposer's Vulcan engine demonstration system conceptual design.
  - The CTDP provides an integrated roadmap for maturing the critical enabling technologies required to enable the Phase III and IV demonstration objectives
  - Initial risk assessments and risk reduction plans are reasonable and adequate for meeting the proposer's demonstration schedule.
- Phase I Design and Analysis Approach
  - Extent to which the proposed design tools and trade study process will yield a robust system design.
  - The proposer has a well defined process for achieving SRR of the Vulcan System design and SRR of the CVC engine design in Phase I.
  - The proposer has an appropriate plan for developing and validating a Vulcan engine performance model in Phase I
- The proposed Phase II program plan meets the Phase II top level objectives with reasonable scope, schedule, technical risk and cost and will credibly meet the Phase III Go/No-Go Criteria.
- The plan proposed for the Phase III of the program identifies appropriate development and test activities for the demonstration of the CVC engine.
- The proposed Phase IV program plan identifies appropriate development and test activities for the demonstration of the Vulcan engine.
- Management and Program Team
  - The professional capabilities and relevant experience of key personnel, including: Program Manager, Chief Engineer, CVC Engine Design Lead, Inlet and Nozzle Design Lead and lead personnel in key disciplines
  - Key personnel have sufficient time committed to the program for their described program roles
  - One or more of the key personnel have previous experience working on CVC development programs including the design, build and testing of these systems.
  - One or more of the key personnel have previous experience working on inlets and nozzles that control the airflow between multiple engine cycles across varying high speed flow regimes including the design, build and testing of these systems.
  - The proposed team has previous experience on demonstration programs with a similar level of complexity to the Vulcan demonstration program
  - The proposed team has adequate personnel and facilities to accomplish all phases of the Vulcan program
  - The proposed management construct provides adequate opportunities for addressing technical, schedule and cost issues with the Government team
  - The proposer's proposed intellectual property and data rights are consistent with the Government's need to be able to communicate program information across

Government organizations and performers to support transition of the program to the users

***iii. Potential Contribution and Relevance to the DARPA Mission***

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

- The degree to which the design presented shows a revolutionary approach to solving the goals of the program and provides the opportunity for novel alternatives to be explored during the program trade studies that may result in high-payoff research.
- Vulcan engine traceability and compatibility for integration into a hypersonic vehicle design with significant military utility.
- Level of substantiation provided and ability for the vehicle to meet the proposer hypersonic vehicle trajectory containing a Vulcan engine.

***iv. Cost Realism***

The objective of this criterion is to establish that the proposed costs are realistic for the technical and management approach offered, as well as to determine the proposer's practical understanding of the effort. 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 proposers to offer low-risk ideas with minimum uncertainty and to staff the effort with junior personnel in order to be in a more competitive posture. DARPA discourages such cost strategies. 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.

After selection and before award the contracting officer will negotiate cost/price reasonableness.

Award(s) will be made to proposers whose proposals are determined to be the most advantageous to the Government, all factors considered, including the potential contributions of the proposed work to the overall research program and the availability of funding for the effort. Award(s) may be made to any proposer(s) whose proposal(s) is determined selectable regardless of its overall rating.

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

*v. 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. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons. For evaluation purposes, a proposal is the document described in "Proposal Information", Section IV.B. Other supporting or background materials submitted with the proposal will be considered for the reviewer's convenience only and not considered as part of the proposal.

Restrictive notices notwithstanding, proposals may be handled for administrative purposes by support contractors. These support contractors are prohibited from competition in DARPA technical research and are bound by appropriate non-disclosure requirements. Subject to the restrictions set forth in FAR 37.203(d), input on technical aspects of the proposals may be solicited by DARPA from non-Government consultants/experts who are strictly bound by the appropriate non-disclosure requirements.

It is the policy of DARPA to treat all proposals as competitive information and to disclose their contents only for the purpose of evaluation.

**B. AWARD ADMINISTRATION INFORMATION**

*i. Award Notices*

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

*ii. Administrative and National Policy Requirements*

**1. Security**

The Government anticipates that proposals submitted under this BAA will be UNCLASSIFIED. In the event that a proposer chooses to submit a CLASSIFIED addendum, the following information is applicable.

Security classification guidance on a DD Form 254 will not be provided at this time since DARPA is soliciting ideas only. After reviewing the incoming proposals, if a determination is

made that the award instrument may result in access to classified information; a DD Form 254 will be issued and attached as part of the award. Proposers choosing to submit a classified addendum must first receive permission from the Original Classification Authority to use their information in replying to this BAA. Applicable classification guide(s) should be submitted to ensure that the proposal is protected appropriately.

Classified submissions shall be in accordance with the following guidance:

**Collateral Classified Information:** Use classification and marking guidance provided by previously issued security classification guides, the Information Security Regulation (DoD 5200.1-R), and the National Industrial Security Program Operating Manual (DoD 5220.22-M) when marking and transmitting information previously classified by another original classification authority. Classified information at the Confidential and Secret level may only be mailed via U.S. Postal Service (USPS) Registered Mail or U.S. Postal Service Express Mail. All classified information will be enclosed in opaque inner and outer covers and double wrapped. The inner envelope shall be sealed and plainly marked with the assigned classification and addresses of both sender and addressee. The inner envelope shall be address to:

Defense Advanced Research Projects Agency  
ATTN: TTO  
Reference: 08-53  
3701 North Fairfax Drive  
Arlington, VA 22203-1714

The outer envelope shall be sealed with no identification as to the classification of its contents and addressed to:

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

All Top Secret materials should be hand carried via an authorized, two-person courier team to the DARPA CDR.

**Special Access Program (SAP) Information:** Contact the DARPA Special Access Program Central Office (SAPCO) 703-526-4052 for further guidance and instructions prior to transmitting SAP information to DARPA. Top Secret SAP, must be transmitted via approved methods for such material. Consult the DoD Overprint to the National Industrial Security Program Operating Manual for further guidance. *Prior to transmitting SAP material*, it is strongly recommended that you coordinate your submission with the DARPA SAPCO.

**Sensitive Compartmented Information (SCI) Data:** Contact the DARPA Special Security Office (SSO) at 703-812-1994/1984 for the correct SCI courier address and instructions. All

SCI should be transmitted through your servicing Special Security Officer (SSO). SCI data must be transmitted through SCI channels only (i.e., approved SCI Facility to SCI facility via secure fax).

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

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

## 2. Intellectual Property

### a. Procurement Contract Proposers

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

Proposers responding to this BAA requesting a procurement contract to be issued under the FAR/DFARS shall identify all noncommercial technical data and noncommercial computer software that it plans to generate, develop, and/or deliver under any proposed award instrument in which the Government will acquire less than unlimited rights, and to assert specific restrictions on those deliverables. Proposers shall follow the format under DFARS 252.227-7017 for this stated purpose. In the event that proposers do not submit the list, the Government will assume that it automatically has "unlimited rights" to all noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, unless it is substantiated that development of the noncommercial technical data and noncommercial computer software occurred with mixed funding. If mixed funding is anticipated in the development of noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, then proposers should identify the data and software in question, as subject to Government Purpose Rights (GPR). In accordance with DFARS 252.227-7013 Rights in Technical Data - Noncommercial Items, and DFARS 252.227-7014 Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation, the Government will automatically assume that any such GPR restriction is limited to a period of five (5) years in accordance with the applicable DFARS clauses, at which time the Government will acquire "unlimited rights" unless the parties agree otherwise. Proposers are admonished that the Government will use the list during the source selection evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer, as may be necessary, to evaluate the proposer's assertions. If no restrictions are intended, then the proposer should state "NONE."

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

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

ii. Commercial Items (Technical Data and Computer Software)

Proposers responding to this BAA requesting a procurement contract to be issued under the FAR/DFARS shall identify all commercial technical data and commercial computer software that may be embedded in any noncommercial deliverables contemplated under the research effort, along with any applicable restrictions on the Government’s use of such commercial technical data and/or commercial computer software. In the event that proposers do not submit the list, the Government will assume that there are no restrictions on the Government’s use of such commercial items. The Government may use the list during the source selection evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer, as may be necessary, to evaluate the proposer’s assertions. If no restrictions are intended, then the proposer should state “NONE.”

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

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

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

Proposers responding to this BAA requesting a Technology Investment Agreement, or Other Transaction for Prototype shall follow the applicable rules and regulations governing these various award instruments, but in all cases should appropriately identify any potential restrictions on the Government’s use of any Intellectual Property contemplated under those award instruments in question. This includes both Noncommercial Items and Commercial Items. Although not required, proposers may use a format similar to that described in Paragraphs 1.a and 1.b above. The Government may use the list during the source selection evaluation process to evaluate the impact of any identified restrictions, and may request additional information from

the proposer, as may be necessary, to evaluate the proposer's assertions. If no restrictions are intended, then the proposer should state "NONE."

c. All Proposers – Patents

Include documentation proving your ownership of or possession of appropriate licensing rights to all patented inventions (or inventions for which a patent application has been filed) that will be utilized under your proposal for the DARPA program. If a patent application has been filed for an invention that your proposal utilizes, but the application has not yet been made publicly available and contains proprietary information, you may provide only the patent number, inventor name(s), assignee names (if any), filing date, filing date of any related provisional application, and a summary of the patent title, together with either: 1) a representation that you own the invention, or 2) proof of possession of appropriate licensing rights in the invention.

d. All Proposers – Intellectual Property Representations

Provide a good faith representation that you either own or possess appropriate licensing rights to all other intellectual property that will be utilized under your proposal for the DARPA program. Additionally, proposers shall provide a short summary for each item asserted with less than unlimited rights that describes the nature of the restriction and the intended use of the intellectual property in the conduct of the proposed research.

***iii. Meeting and Travel Requirements***

There will be a program kickoff meeting and all key participants are required to attend. Other meetings for Phase I and II are defined above. Performers should also anticipate periodic site visits at the Program Manager's discretion.

***iv. 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 subject research must provide documentation of completing appropriate training for the protection of human subjects.

For all proposed research that will involve human subjects in the first year or phase of the project, the institution must provide evidence of or a plan for review by an Institutional Review Board (IRB) upon final proposal submission to DARPA. The IRB conducting the review must be the IRB identified on the institution's Assurance. The protocol, separate from the proposal, must include a detailed description of the research plan, study population, risks and benefits of study participation, recruitment and consent process, data collection, and data analysis. Consult the designated IRB for guidance on writing the protocol. The informed consent document must comply with federal regulations (32 CFR 219.116). A valid Assurance along with evidence of appropriate training all investigators should all accompany the protocol for review by the IRB.

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

The amount of time required to complete the IRB review/approval process may vary depending on the complexity of the research and/or the level of risk to study participants. Ample time should be allotted to complete the approval process. The IRB approval process can last between one to three months, followed by a DoD review that could last between three to six months. No DoD/DARPA funding can be used towards human subject research until ALL approvals are granted.

#### *v. 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>.

#### *vi. Publication Approval*

Proposers 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. Any award resulting from such a determination will include a requirement for DARPA permission before publishing any information or results on the program.

The following provision will be incorporated into any resultant procurement contract or other transaction:

When submitting material for written approval for open publication, the Contractor/Awardee must submit a request for public release to the DARPA TIO and include the following information: 1) Document Information: document title, document author, short plain-language description of technology discussed in the material (approx. 30 words), number of pages (or minutes of video) and document type (briefing, report, abstract, article, or paper); 2) Event Information: event type (conference, principle investigator meeting, article or paper), event date, desired date for DARPA's approval; 3) DARPA Sponsor: DARPA Program Manager, DARPA office, and contract number; and 4) Contractor/Awardee's Information: POC name, e-mail and phone. Allow four weeks for processing; due dates under four weeks require a justification. Unusual electronic file formats may require additional processing time. Requests can be sent either via e-mail to [tio@darpa.mil](mailto:tio@darpa.mil) or via 3701 North Fairfax Drive, Arlington VA 22203-1714, telephone (571) 218-4235. Refer to [www.darpa.mil/tio](http://www.darpa.mil/tio) for information about DARPA's public release process.

#### *vii. Export Control*

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

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

(including deemed exports) hardware, technical data, and software, or for the provision of technical assistance.

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

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

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

#### ***viii. 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 that is not a “small business concern” and submits a contract proposal which 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. Industry size standards are published by the Small Business Administration at <http://www.sba.gov/size>. The plan format is outlined in FAR 19.704.

#### ***ix. Reporting***

The award document for each proposal selected and funded will contain a mandatory requirement for: 1) Monthly Status Reports, one of which will be an annual project summary and 2) monthly financial reports. Reports and briefing material will also be required as appropriate to document progress in accomplishing program metrics. A Final Report that summarizes the project and tasks will be required at the conclusion of the performance period for the award, notwithstanding the fact that the research may be continued under a follow-on vehicle. The reports shall be prepared and submitted in accordance with the procedures contained in the award document and mutually agreed on before award.

#### ***x. 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>

*xi. Representations and Certifications (ORCA)*

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

*xii. 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. AGENCY CONTACTS**

Administrative, technical or contractual questions should be sent via e-mail to [BAA08-53@darpa.mil](mailto:BAA08-53@darpa.mil). If e-mail is not available, fax questions to (703) 696-8401, Attention: BAA 08-53. All requests must include the name, email address, and phone number of a point of contact.

The technical POC for this effort is  
Dr. Thomas Bussing  
DARPA/ TTO  
ATTN: BAA 08-53  
3701 North Fairfax Drive  
Arlington, VA 22203-1714  
electronic mail: [BAA08-53@darpa.mil](mailto:BAA08-53@darpa.mil)

The contracting POC for this effort is  
Mr. Christopher Glista  
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3701 North Fairfax Drive  
Arlington, VA 22203-1714  
Electronic mail: [BAA08-53@darpa.mil](mailto:BAA08-53@darpa.mil)

**D. OTHER INFORMATION**

An Industry Day was held on June 10, 2008. The proceedings, FAQ and attendee list may be found at:

<http://www.darpa.mil/tto/solicitations.htm>