

# **PROPOSER INFORMATION PAMPHLET (PIP)**

**COMBAT ZONES THAT SEE (CTS)**

**BROAD AGENCY ANNOUNCEMENT 03-15  
(BAA 03-15)**

**DEFENSE ADVANCED RESEARCH PROJECTS AGENCY (DARPA)**

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### **DEFENSE ADVANCED RESEARCH PROJECTS AGENCY (DARPA)**

#### COMBAT ZONES THAT SEE (CTS)

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## **1.0 GENERAL INFORMATION**

### **1.1 Definition of BAA as contemplated in the FAR**

The information provided in this Proposer Information Pamphlet (PIP), in addition to that provided in the FedBizOpps BAA 03-15, constitutes a Broad Agency Announcement as contemplated in the FAR 6.102 (d)(2)(i).

### **1.2 Administrative correspondence**

DARPA intends to use electronic mail for most technical and administrative correspondence regarding this BAA. All correspondence and questions concerning this BAA must be delivered, in writing, via email address baa03-15@darpa.mil and should include the originator's full name, direct phone number, and return e-mail address.

### **1.3 Frequently Asked Questions file pointer**

The Frequently Asked Questions (FAQ) are available at URL: [www.darpa.mil/ixo/solicitations/cts/index.htm](http://www.darpa.mil/ixo/solicitations/cts/index.htm). Administrative, technical, or contractual questions should be sent via e-mail to baa03-15@darpa.mil. If e-mail is not available, please fax questions to (703) 522-7161 (Attention: BAA 03-15). All requests must include the name, address, and phone number of a point of contact.

#### 1.4 Summary of Important Dates

6 March	Pre-Solicitation Announcement	
25 March	BAA 03-15 Published	
20 Mar	Pre-registration Deadline for Briefing to Industry	<a href="http://www.schafercorp-ballston.com/bti2003">http://www.schafercorp-ballston.com/bti2003</a>
27 Mar	Briefing to Industry	<a href="http://www.schafercorp-ballston.com/bti2003">http://www.schafercorp-ballston.com/bti2003</a>
29 Apr	Deadline for Registration to Propose	<a href="http://www.darpa.mil/ixo/solicitations/cts/index.htm">http://www.darpa.mil/ixo/solicitations/cts/index.htm</a>
13 May	Proposals Due (Initial Closing)	
29-30 May	Proposal Evaluation	
29 Aug	Contract Awards	
9 Sept	Kick-off Meeting	
25 Mar 04	BAA 03-15 Closes	

#### 1.5 Pre-solicitation activities

DARPA intends to hold an Industry Day for BAA 03-15 on Thursday, 27 March 2003, 0830 to 1500 in Arlington, Virginia. The point of contact for Industry Day is Mr. Darryl Richards, Schafer Corporation. Tel: 703/516-6705 and e-mail: [drichards@schafercorp-ballston.com](mailto:drichards@schafercorp-ballston.com).

Pre-registration for the Combat zones That See (CTS) Briefing to Industry (BTI) is mandatory. Pre-registered persons will be required to show government-issued identification (i.e., drivers license, etc.) at meeting check in. Interested organizations should reference URL: <http://www.schafercorp-ballston.com/bti2003> for details on location and registration. Attendees must register by 20 March 2003. Persons not pre-registered will be turned away at meeting check-in.

## **2.0 INTRODUCTION**

### **2.1 Background**

Military Operations in Urban Terrain (MOUT) are fraught with danger. Urban canyons and abundant hide-sites yield standoff sensing from airborne and space-borne platforms ineffective. Short lines-of-sight neutralize much of the standoff and situation awareness advantages currently rendered by U.S. forces. Large civilian populations and the ever-present risk of collateral damage preclude the use of overwhelming force. As a result, combat in cities has long been viewed as something to avoid. However, modern asymmetric threats seek to capitalize on these limitations by hiding in urban areas and forcing U.S. Forces to engage in cities. We can no longer avoid the need to be prepared to fight in cities. Combat zones That See will produce video understanding algorithms embedded in surveillance systems for automatically monitoring video feeds to generate for the first time, the reconnaissance, surveillance, and targeting information needed to provide close-in, continuous, always-on support for military operations in urban terrain.

### **2.2 Objective**

Combat zones That See explores concepts, develops algorithms, and delivers systems for utilizing large numbers (1000s) of cameras to provide the close-in sensing demanded for military operations in urban terrain. Automatic video understanding will reduce the manpower needed to view and manage this monumental collection of data and reduce the bandwidth required to exfiltrate the data to manageable levels. The ability to track vehicles across extended distances is the key to providing actionable intelligence for military operations in urban terrain. Combat zones That See will advance the state of the art for multiple-camera video tracking to the point where expected track lengths reach city-sized distances. Trajectories and appearance information, resulting from these tracks, are the key elements to performing higher-level inference and motion pattern analysis on video-derived information. Combat zones That See will assemble the video understanding, motion pattern analysis, and sensing strategies into coherent systems suited to Urban Combat and Force Protection.

### **2.3 Program Structure**

Successful realization of the Combat zones That See objectives requires a relevant and comprehensive approach to design, architecture, research, development, integration, evaluation, demonstration, installation, and maintenance. Rather than solicit a collection of related but independent projects that need to be massaged into a coherent system, it is the intent of the government through this BAA to contract with a single integrated team that is exceptionally qualified to carry out all aspects of the CTS Program. The successful team will not only have the ability to perform exceptional research in the key technologies, but also to integrate, install, and maintain a system based on those technologies. While this BAA outlines some of the minimal capabilities that such a system should possess, it is expected that the successful Offeror will craft a solution that combines additional capabilities of the Offeror's choosing, with those described herein,

to create a demonstrable system that provides a coherent, comprehensive realization of the CTS objectives

### 3.0 TECHNICAL APPROACH

#### 3.1 Overview of CTS technology thrusts

The inherently three-dimensional nature of urban centers, with large buildings, extensive underground passageways, and concealment from above requires the use of close-in imagery sensing, to obtain vital reconnaissance and targeting information. The rapid proliferation of low-cost video sensors presents an opportunity to obtain the necessary reconnaissance and targeting information by deploying large numbers of video cameras. The key technical goal of Combat zones That See is to produce the algorithms for automatically monitoring video feeds to provide the reconnaissance and targeting information needed 24/7 to support military operations in urban terrain. The volume of data involved precludes wireless transmission and manual observation of all sensor feeds. Instead, local automatic processing of video feeds is required. By co-locating processors with video cameras, the bandwidth required to effectively support military operations can be reduced to manageable levels. Combat zones That See intends to track all vehicles that move within an extended area of observation. Despite the decreasing cost of cameras, processors, and communications, the complete observation of an entire metropolitan area is not practical. Hence, it will be necessary to develop vehicle-association technology that permits reliable tracking of individual vehicles, using cameras whose Fields of View (FOV) do not overlap. Vehicle tracks will also be used to calibrate cameras, learn patterns of activity, and retrieve similar or related events from a track database. Motion-pattern analysis will be employed to assist in finding common elements among the collected tracks. Realizing this vision requires solutions to the following problems:

- **Sensors:** How do we put the cameras in the right places, at the right time?
- **Video Understanding:** What processing is required and how is it accomplished?
- **Motion Pattern Analysis:** What use do we make of the data derived from video?
- **Communications:** How do we filter and exfiltrate the data?
- **System Management and Control:** How do we manage and operate the Combat zones That See System?

To the extent they are needed, CTS will use existing commercial capabilities for reading license plates and recognizing humans – additional research to extend the state of the art in these areas is excluded. The CTS program intends to make maximum use of existing commercial off-the-shelf (COTS) sensor and communications technologies; further development in these areas is not desired. Instead, CTS will focus on creating the needed video understanding and motion-pattern analysis technologies that do not exist today.

### 3.2 General Approach

CTS will develop and deploy a multi-camera video surveillance system that combines COTS technologies with its own research products to realize the performance goals described herein. A single CTS system integrator/development team will be chosen to design, develop, integrate, and demonstrate technologies for DARPA. Sufficient resources must be budgeted to cover all aspects of this program, to include the provision of any necessary on-site personnel to maintain the system and install upgrades in the field. The Combat zones That See program will be developed in two stages, using a spiral process with increasing levels of complexity:

- **Stage 1: Force Protection (FP) Configuration.** An initial (largely COTS) Combat zones That See capability will be rapidly developed in the Combat zones That See system integrator's lab and deployed to Fort Belvoir, Virginia. This deployed configuration will serve as a platform for concept development and technology integration. Close cooperation between the user and developer is envisioned in order to tailor Combat zones That See technologies for force protection applications. Extensive testing and evaluation of key technologies should take place using this testbed at Fort Belvoir. The ability to track vehicles over extended distances using fixed surveillance cameras separated by large distances is the central capability to be developed and demonstrated. Once this configuration's technologies have been sufficiently matured, hardened, and evaluated, it will be deployed to an overseas urban location for additional user interaction and evaluation.
- **Stage 2: MOUT Configuration.** The Military Operations in Urban Terrain (MOUT) Configuration incorporates the development activities and lessons learned from the Force Protection Configuration, plus additional technology to provide a Combat zones That See configuration optimized for mobile forces in urban combat settings. Rapid deployment of a large video network is the central concept that differentiates the MOUT Configuration from the FP Configuration. Additional capabilities for analyzing the derived vehicle track data should be developed and demonstrated. Initial MOUT Configuration integration and development should occur in the Combat zones That See system integrator's lab prior to deployment to Fort Belvoir. Once the technologies have matured and the system has been hardened and evaluated, it also will be deployed to an overseas location for additional evaluation.

## **4.0 DESCRIPTION OF TECHNICAL AREAS**

### **4.1 Force Protection Configuration**

#### 4.1.1 Objective.

Develop and deploy, with close user involvement, the Combat zones That See Force Protection (FP) configuration. The Force Protection Configuration should begin with a rapid integration of COTS capabilities to provide a 24/7 surveillance capability of selected sites and routes at Fort Belvoir, Virginia. This effort will define the CTS hardware and software interfaces and develops the CTS graphical user interface. This configuration will be developed in CONUS and later deployed to an overseas urban location suitable for support to Force Protection (FP) Operations following satisfactory evaluation of the performance goals at Ft. Belvoir.

#### 4.1.2 Functional Capabilities.

The Force Protection Configuration will track vehicles (and personnel associated with vehicles) moving through checkpoints and along routes at Fort Belvoir. Selected observation sites will also provide identification of vehicles and occupants. The system should provide automatic alerts to system operators, when vehicles reach pre-determined checkpoints, fail to reach pre-determined checkpoints within a specified period of time, or fail to follow specified routes. The system should alert system operators when vehicles complete their route and identify when personnel enter or exit a vehicle under observation. The system should compare collected information to watch-list files (vehicles and subjects) and be capable of saving high-value video clips for subsequent operator viewing. The system will provide an interactive graphical interface to assist operators in the viewing and understanding of collected information. The display should include both plan and camera views of tracks to the operator(s). Once deployed to an overseas location, the Force Protection Configuration will provide operators with enhanced situation awareness by extending surveillance of the force protection battlespace beyond the perimeter of secure compounds with no increases in manpower. Operators will possess the capability to define normal activities along surveillance tracks and at sites. The system should automatically alert operators to the presence of abnormal and/or suspicious activities such as the 'tailing' of friendly vehicles, and intrusion into sensitive areas (areas of concern and areas of operation). Operators will be able to extract information from the FP Configuration that will allow them to perform multiple types of advanced analyses. Operators should also be able to link people to vehicles.

#### 4.1.3 Technical Capabilities.

##### *4.1.3.1 Sensors.*

The FP Configuration will deploy at least 30 fixed COTS video cameras. Additional cameras currently in use at Ft. Belvoir may also be included in the network. The video sensor array will capture, characterize, and transmit vehicle trajectories (tracks) and related information for processing and analysis. Camera locations will be chosen by the

contractor (with Government approval) to optimize the ability to track vehicles across extended distances. Average camera separation may be on the order of 500 meters, but some cameras may be separated by as much as 3 kilometers. Most cameras are expected to be positioned, oriented, and zoomed so as to obtain moderate-resolution imagery (1-3 cm pixel width) of vehicular traffic. Each camera will have a dedicated processor associated with it, either physically or logically. A small number of additional higher resolution cameras may be employed to support license plate reading and/or face recognition.

#### *4.1.3.2 Video understanding.*

The FP Configuration will be capable of automatically tracking all vehicles observed by its network of video cameras. The configuration should automatically detect, track, and perform camera-to-camera hand off of all vehicle tracks. Video processing of vehicle track information may be accomplished remotely. At selected sites, the system can also employ a COTS license plate recognition capability and a COTS face recognition capability, to be used for track initiation and/or track annotation.

The successful tracking of individual vehicles over extended distances is the most important technology to be developed by the CTS program. Offerors are expected to perform original research in vehicle association and tracking to extend the state of the art to the point where CTS performance goals for tracking can be met with a reasonable camera separation. Vehicle association across cameras whose fields of view (FOV) do not overlap is the critical capability to be developed toward reaching this goal.

#### *4.1.3.3 Motion pattern analysis.*

Only first order analysis of vehicle trajectories is expected in the FP configuration. For example, the system should be capable of discerning whether two vehicles had a common origin or destination, or whether two tracks could possibly have been separate observations of the same vehicle.

#### *4.1.3.4 Communications.*

An objective of the Combat zones That See program is to develop the capability to operate the CTS systems using standard commercial and military communications systems. The FP Configuration should employ in-place, fixed communications — wireless communications is not required for the FP Configuration.

#### *4.1.3.5 System Management and Control.*

The Combat zones That See (CTS) Force Protection (FP) Configuration will develop and implement hardware and software interfaces, human computer interfaces (to include the Graphical User Interface (GUI)), database implementations, interfaces, record keeping and other management and control features of the system. FP Configuration capabilities should incorporate the management of communications interfaces, management of interfaces with external sources of information, video network control; and system status monitoring. GUI displays at a minimum must be capable of displaying a plan view of the monitored area, with appropriate icons for displaying the locations of cameras and

vehicles under track. Although only several dozen cameras will be employed as part of the FP configuration, the CTS architecture should be designed to scale up to handle a network of thousands of cameras.

#### 4.1.4 Performance Goals

The selection and specification of capabilities present in the FP Configuration is left to the Offeror and is expected to evolve over the course of the Program, based on experience and feedback with operational usage. At a minimum, the FP Configuration must meet the following Go/No go criteria on or before Month 16 after start of Contract:

- Maintain track of 90% of all vehicles for at least 10 km for any 30-minute period of the day
- Track vehicles forward and backward in time
- Initiate tracks based on location; license plate #
- Compare vehicles to watch lists indexed by license plate numbers
- Tail suspect vehicles
- Automate alerts with 10-second video clips within 60 seconds of event:
  - Vehicle start or stop at designated location
  - License plate # match to watch list
  - 2 or more vehicles with common origin/destination
- Store up to 1 million vehicle trajectories and retrieve individual trajectories based on location and appearance within 3 seconds

## **4.2 MOUT Configuration**

### 4.2.1 Objectives.

The Force Protection (FP) Configuration will be augmented with solutions to provide rapid deployment of sensors, self-calibration, and motion pattern analysis suitable for support to military operations in urban terrain (MOUT). The MOUT Configuration is intended to support mobile forces conducting a variety of urban reconnaissance and combat operations. Thus, the system should possess the flexibility and adaptability to support such operations. Rapid and innovative deployment of large numbers of sensors (at least 100) is a key capability of the MOUT Configuration.

#### 4.2.2 Functional Capabilities.

In addition to capabilities found in the Force Protection Configuration, the MOUT Configuration will provide for the rapid deployment of a video network comprised of hundreds of cameras with associated processing and communications. Using this network, the MOUT Configuration will auto-detect and track all moving vehicles within the systems field of view (FOV), display tracks of those movers in the operators' plan view, provide full motion video on demand, and provide 'track' updates to forces on the move. The configuration should provide forces with the capability to conduct remote video route recons and with moving video zones of security and pursuit. The configuration should be able to automatically adapt to both planned and unplanned changes in configurations. The system should be easily managed and portray information to operators in an intuitive fashion. The configuration should capitalize upon COTS communications systems, yet be capable of interfacing to communications capabilities organic to the supported military force. The configuration should employ advanced motion pattern analysis techniques to glean information from the track data collected by the configuration array. This information, supplemented with outside information, will provide operators with enhanced battlespace situation awareness.

#### 4.2.3 Technical Capabilities.

##### *4.2.3.1 Sensors.*

Large quantities of multiple types of sensors will be deployed in the MOUT Configuration. For use with forces on the move in urban areas, the MOUT Configuration cannot depend upon access to existing cameras or deliberate installation. Instead, the MOUT Configuration must employ cameras that happen to be available, but should also provide a means to deploy a video network rapidly and on-demand in urban terrain that is denied to friendly forces. Offerors should identify their choices and rationale for sensors and deployment options for use by mobile forces to screen a flank or surveil a critical route. Examples include traditional surveillance cameras; small, portable, and possibly mobile self-contained surveillance devices; video sensors mounted on organic aerial vehicles; and 'video ropes' containing hundreds of miniature cameras connected by a kilometer-long cable which provides power and communications to all the cameras.

##### *4.2.3.2 Video Understanding*

The MOUT Configuration should incorporate all of the automated video analysis functions of the FP Configuration, plus additional capabilities as needed for support to urban operations. The requirement for rapid deployment of large numbers of video sensors precludes manual set up and calibration of each camera. Instead, the video array must possess the capability to self-register, self-calibrate, and adjust to changes in position, orientation, and focal length of any and all cameras within the network. Such calibration should be as automated as possible through observation of the environment and objects moving within the environment.

#### *4.2.3.3 Motion Pattern Analysis (MPA).*

The MOUT Configuration will provide operators with 2nd order information derived from collected track, license plate, and human subject information. This should include basic statistical modeling of track information (what is normal, what is not); analysis of changes in normalcy models; detection of variances in activity; anomaly detection based upon statistical analysis; discovery of links between places, subjects, and times of activities; and direct comparison and correlation of track data to other information available to the operators. Predictive modeling, plan recognition, and behavior modeling should alert operators to potential force protection risks and threat situations. Forensic information (where did a vehicle come from, how did it get here?) should be combined and contrasted with more powerful ‘forward-tracking’ capabilities (where could the vehicle go, where is the vehicle going?) to provide operators with real-time capabilities to assess potential force protection threats. MPA should assist operators in correlating and identifying links between seemingly unrelated events. MPA should detect significant changes in street or zone characteristics and automatically alert operators to those changes. MPA should assist operators in verifying the location of friendly forces in plan view, enemy forces and vehicles, and potential non-combatants.

#### *4.2.3.4 Communications.*

Combat zones That See capabilities in the MOUT Configuration must be capable of operating over communications means suitable for rapid deployment of video networks. The configuration needs to be capable of taking advantage of in place communications (when available) and augmenting those communications with both COTS and Government off-the-shelf (GOTS) capabilities usable by the supported military force (fixed and wireless).

#### *4.2.3.5 System Management and Control.*

The MOUT Configuration requires the capability to adjust the employment of sensor arrays and processing capabilities for different missions, different forces, different threats, and different areas of operations. The configuration will be capable of managing these planned and unplanned changes in configuration. The configuration should also be able to monitor and portray system health, detect and repair component failures, adjust to changes in configuration brought about by a failure of sensors, power, communications, or a combination of the same. The MOUT configuration should provide an intuitive interface to supported military forces.

#### 4.2.4 Performance Goals

The selection and specification of the complete set of capabilities present in the MOUT Configuration is left to the Offeror and is expected to evolve over the course of the Program, based on experience and feedback with operational usage. At a minimum, the MOUT Configuration must meet all of the FP Configuration Performance goals listed in Section 4.1.4, plus the following Go/No go criteria on or before Month 28 after start of Contract:

- Install and operate 100 surveillance cameras within 12 hours
- Early warning of hostile threats: Alert whenever  $N$  vehicles from hostile location approach within  $X$  meters of friendly force position
- Correlation of seemingly unrelated events
  - Find 90% of common vehicles across 2 one-hour long sets of observations
- Alert abnormal activities
  - Report 1% statistically most unusual events

### **4.3 Summary of Technical Approach**

The Combat zones That See program aspires to build the world's first multi-camera surveillance system that uses automatic cooperative analysis of live video streams to provide a comprehensive understanding of vehicular activity and significant events across an extremely large area of observation.

To this end, it will be necessary for the successful Offeror to define an architecture, a series of processing tasks, and a development plan that is well suited to the current and future needs of military forces operating in urban terrain. The requirements listed in this document are a starting point – they are neither complete nor sufficient for realizing the full potential of automated video surveillance. Significant innovation on the part of the Offeror is necessary, both during the proposal stage as well as throughout the duration of the program.

There are many design choices and processing trades inherent in the CTS vision. Proposals must identify the design choices made, and provide supporting rationale for those choices. Proposals must provide a concrete description of the proposed architecture, the hardware and software components of the system, the communications requirements and solutions, the video processing algorithms to be employed or developed, and the mechanisms for the operator(s) to interact with the system. While innovation and flexibility will be required throughout the Program, a solid and relevant foundation on which to build is essential.

## 5.0 PROJECT STRUCTURE

The CTS Program will be performed by a single contractor team capable of performing all aspects of the Program, including: design system architecture, develop needed video understanding technologies, integrate complete system, install, operate, evaluate, and maintain the CTS system throughout the lifetime of the program. CTS contractors will work closely with Department of Defense (DoD) operational users to refine, evaluate, and improve the deployed system. The contractor team will provide sufficient numbers of qualified on-site personnel to carry out these tasks.

### 5.1 Program schedule

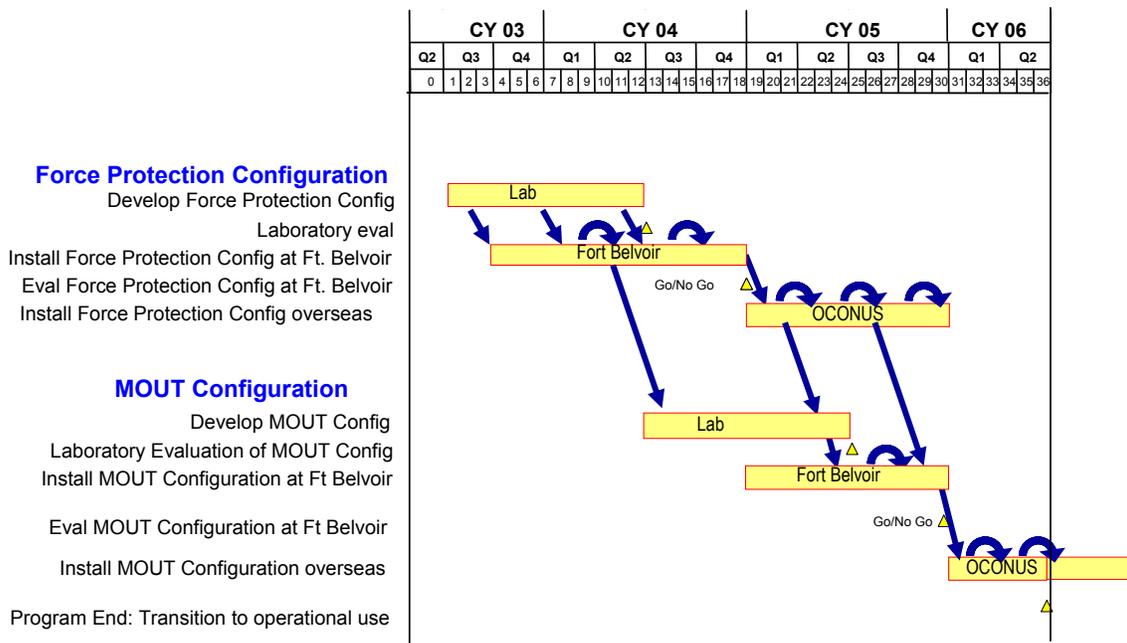


Table 1 – Program Schedule

## 5.2 Project Phases and Milestones

The Combat zones That See Program Milestones are established as follows:

### Milestone

- Month 0: Contracts Start
- Month 3: Laboratory Evaluation of initial Force Protection Configuration
- Month 4: Install initial Force Protection Configuration at Ft Belvoir
- Month 12: Laboratory Evaluation of Force Protection Configuration
- Month 13: Install Force Protection Configuration at Ft Belvoir
- Month 16: Evaluate Force Protection Configuration at Ft Belvoir \* Go/No go
- Month 19: Install Force Protection Configuration at OCONUS site
- Month 24: Laboratory Evaluation of MOUT Configuration
- Month 25: Install MOUT Configuration at Ft Belvoir
- Month 28: Evaluate MOUT Configuration at Ft Belvoir \* Go/No go
- Month 31: Install MOUT Configuration at OCONUS site
- Month 36: Program end. Complete transition to supported unit

Offerors are expected to describe a comprehensive Project Plan that achieves the Milestones listed above on or before the dates indicated. The Offeror's Project Plan must include appropriate additional milestones suitable for managing and tracking progress according to the plan.

## 5.3 Security

### 5.3.1 General.

The Combat zones That See program will develop technologies using unclassified sensors, data, techniques, and procedures. Technology development in the Combat zones That See program will be unclassified. The technical results of the Combat zones That See program will also be unclassified. However, the Combat zones That See program may deploy to environments in which CTS technologies and capabilities are focused to support classified military operations for the purposes of operational test and evaluation. The Combat zones That See program may also develop specific imagery and/or target models that are based upon sensitive or classified military targets. In these situations, the capabilities of CTS technologies will be classified in accordance with the security classification guides of the supported organization(s). The CTS system integrator (SI)

must ensure that the technical and evaluation goals of the CTS program will be met, even when security restrictions to address situations like those described above are implemented. Mechanisms to ensure this may include the ability to restrict portions of the work to particular individuals/teams, to ensure compliance with appropriate security regulations or establishing teaming agreements which allow for the segmentation of work between or among the integrator's team. The system integrator must provide a security plan in their proposals to address these issues.

### 5.3.2 U.S. Citizenship and Security Clearance Certifications.

U.S. and Non-U.S. citizens are authorized to perform work on unclassified portions of the Combat zones That See program. However, only U.S. citizens with security clearances will be authorized to work on those portions of the CTS program that are classified.

### 5.3.3 Facility Clearance Certification.

Facility Clearance Certification (FCC) is required only for system integrators. Proposers (system integrators) shall certify to DARPA/Security and Intelligence Directorate (DARPA/SID), through appropriate security channels, that their organization holds an active FCC, the level of FCC granted, and the Defense Security Service (DSS) issued facility cage code.

### 5.3.4 Security Management and Administration Specification.

System Integrators shall describe their organization's approach to maintaining separation of unclassified and classified activities and materials, and controlling access to classified information, based on the need-to-know of its cleared personnel.

## **5.4 Restrictions on Surveillance**

Certain laws of the United States place restrictions on the use of video surveillance, including some of the capabilities envisioned within the Combat zones That See concept. It is the policy of DARPA, the DoD, and the U.S. Government to respect and obey all applicable laws. Combat zones That See capabilities that are covered by such laws will be employed, tested, and demonstrated only in situations where they are fully allowable by all such laws. CTS technology is intended for use in conjunction with military force protection and urban combat operations, not homeland security or law enforcement. CTS technology will be demonstrated only within the observable boundaries of government installations where video surveillance is expressly permitted, and operational deployment areas outside the United States where it is consistent with all local laws.

## **6.0 AVAILABLE FUNDING**

### **6.1 Awards**

One award is anticipated for design, architecture, research, development, integration, evaluation, demonstration, installation, and maintenance of all technologies developed in the Combat zones That See program. Expected funding level is up to \$4 million per year for 3 years. Non-critical path tasks that can be cleanly separated as individual modules should be proposed and costed as options. The contract will be incrementally funded by fiscal year, assuming identified milestones have been satisfactorily met. Funding in the out years is subject to satisfactory evaluation of the Go / No go criteria as well as availability of funds.

Contract Mechanisms:

Awards will be in the form of Cost Plus Fixed Fee (CPFF) or Cost Reimbursement (CR) contracts, Delivery Order (Indefinite Delivery/Indefinite Quantity), Cooperative Agreements, or Other Transactions. Grants are not likely to be used.

### **6.2 Anticipated Funding**

DARPA will fund efforts that are likely to succeed, based on soundness of approach, qualifications, and innovation within a cost estimate that is deemed realistic and reasonable.

## **7.0 SELECTION CRITERIA**

Proposals will be selected through a technical/scientific/business decision process with technical and scientific considerations being most important. Evaluations will be performed using the following criteria listed in descending order of relative importance:

### **(1) Quality and Technical Merit:**

- Understanding of scope of the problem(s) and identification of technical issues
- Soundness and completeness of the system design.
- Potential for highly reliable video understanding solutions
- Justification of design choices as compared to alternative techniques
- Degree of innovation; potential for revolutionary advance

### **(2) Relevance of Proposed Approach to Combat zones That See Program Goals**

- Level of realism and the clear definition of the problem domain
- Suitability and clarity of the proposed capabilities for operational purposes
- Quality and clarity of the Statement of Work (SOW) and Program Plan.
- Quality of the Evaluation Plan

### **(3) Capabilities and Experience**

- Qualifications and of proposed technical personnel; their availability for the duration of the contract
- Proposer's experience related to the proposed technology area
- The ability to manage the proposed effort
- Adequacy of proposed hardware and software infrastructure
- Adequacy of security plan

### **(4) Offerors Approach to Technology Transfer**

- Understanding of video system architectures in laboratory and operational environments
- Potential for low-cost integration into operational environments
- Commitment to delivering results to others

### **(5) Cost Realism and Value of Proposed Work to Government**

- The total cost relative to benefit.
- The realism of cost levels for facilities and staff (including students)
- The cost-effective use of existing equipment and software; competitive costs on procurements

- The cost-effectiveness of technology transfer

## **8.0 GENERAL AND ADMINISTRATIVE INFORMATION**

### **8.1 Electronic Proposal Submission**

Proposal abstracts ARE NOT requested in advance of full proposals. DARPA will employ an electronic upload process for proposal submissions for BAA 03-15.

Performers may find guidance for proposal submission at URL:  
<http://www.darpa.mil/ixo/solicitations/cts/index.htm>.

Organizations must register at the above-mentioned URL to propose. Only the lead or prime organization should register. One registration per proposal should be submitted. This means that an organization wishing to submit multiple proposals should complete a single registration for each proposal. The deadline for registration is 29 April 2003 at the URL listed above. By registering, the Proposer has made no commitment to submit.

### **8.2 Contractor Cooperation and Exchange**

Offerors must be willing to cooperate and exchange software, data, and other information with other contractors if it contributes to the success of the program. This includes coordination with a contractor or integrator, chosen by DARPA, if appropriate. A statement of cooperation must be included in the final proposal.

### **8.3 Proposal and Media Classification**

Proposal Submissions **must be unclassified**.

### **8.4 General Proposal Format**

The Proposals shall consist of two (2) separate volumes.

A Table of Contents will be contained in both volumes.

Volume I is the Technical Proposal. Volume I will be limited to 40 pages (including one cover page and the table of contents, and excluding the “Qualifications” and “References” sections).

Volume II is the Cost Proposal. Volume II will be limited to 21 pages, including back-up information.

Please note: Proposals with less than the maximum number of allowed pages will NOT be penalized. Proposals exceeding the page limit will not be reviewed. Offerors are encouraged to submit concise, cleanly written, but descriptive proposals.

### **8.5 Volume I Format**

The Technical Proposal will be submitted in the following format:

- Page size set at 8.5 x 11 inches
- Line spacing 1.5 or double-spaced
- Margins no less than 1 inch

- Page numbers inserted on lower right
- Type size of 12 points
- Limit of 20 Megabytes

**8.6 Volume 1: Guidance on Technical Proposal**

The Cover Page include the following information [ref. Attachment 1]:

1. BAA Number
2. Title of Proposal
3. Identity of Prime Offeror
4. Complete list of subcontractors, teaming organizations
5. Technical point of contact (name, address, phone, fax, email)
6. Administrative contact (name, address, phone, fax, email)
7. Finance ([T-FIMS](#)) administrator (name, phone, fax, email)
8. Type of business (large business, small business, university, etc.)
9. Duration of effort (Differentiate between basic effort and options.)
10. \*Proposed costs (Represent costs in following format sample)

Year	**CY03	CY04	CY05	
Months	Sep-Aug	Sep-Aug	Sep-Aug	
Base	\$NNN	\$NNN	\$NNN	\$Total base
Options	\$NNN	\$NNN	\$NNN	\$Total options
Total Cost				\$Total cost

\*This information may be entered after registration up to the time the proposal is locked.  
 \*\*CY = Calendar Year

The following are subsections, descriptions, and page/character limitations to be submitted in the proposal. Note that character count does not include spaces.

- A. Executive Summary [1 page]:** This summary should include: (1) a visionary system description that supports the goals of the BAA, (2) innovative ideas proposed, (3) the expected impact of the research if successful, (4) description of the capabilities to be developed, and (5) the major project deliverables.
- B. Innovative Claims [1 page]:** The innovative claims summary must identify any technical ideas to be pursued and their expected impact on the state of the art in video understanding technology. This page should succinctly describe the uniqueness of the proposed contribution.
- C. Vision [3 pages]:** This section must describe a hypothetical, yet relevant, advanced video surveillance concept consistent with CTS Program Goals. Intended capabilities must be quantified with appropriate metrics and expected performance goals.
- D. Deliverables and Products [4 pages]:** This section must enumerate the deliverables of the proposed effort, and the due date for each. The list must include deliverables relevant to the CTS Program Schedule (see Section 5.1) and requirements, plus any additional deliverables that are offered.

- E. Schedule and Milestones [1 page]:** Provide a summary of the schedule of the major events and milestones for the proposed effort. Milestones must be specific and must be goal or performance oriented.
- F. Proprietary Claims [1 page]:** Include here a summary of any proprietary claims to results, prototypes, or systems supporting and/or necessary for the use of research, results and/or prototype. Any claims made in other parts of the proposal that would impact the claims in this section must be cross-referenced. Proprietary claims must be substantiated. If there are no proprietary claims, this section shall include a statement to that effect.
- G. Statement of Work (SOW) [5 pages]:** This section must detail the scope, background, objective, and approach of the proposed effort and describe the content and timing of specific tasks to be performed and the specific utilization of subcontractors. Include a detailed list of technical tasks/subtasks organized in a manner consistent with the project schedule. Also identify which personnel and subcontractors (if any) will be involved. The SOW may contain optional tasks proposed. All optional tasks must be costed separately from base effort tasks.
- H. System Design [10 pages]:** The System Design presents the architecture of the proposed solution to Combat zones That See, including information on the sizing, timing, and related performance metrics. The system design section must provide details on the proposed technical capabilities and include technical arguments to substantiate innovative claims made in Section B. It must include a discussion of design decisions made and a comparison with alternative approaches indicating both advantages and disadvantages of the proposed approach.
- I. Evaluation Plan [4 pages]:** The Evaluation Plan describes the critical experiments to be performed, the data to be used, the evaluation metrics to be applied, and the software instrumentation to test plans to facilitate repeatable experimentation. This section must include a description of metrics that could/will be used for evaluating the impact of the effort, and the performance goals needed to achieve the vision described in Section C.
- J. Management Plan [1 pages]:** Describe the overall approach to management of this effort, including a very brief discussion of the organizational structure, roles of key personnel, team/subcontractor relationships, government manager and facilities interface as well as planning, scheduling, and control practices.
- K. Technology Transition Plan [1 page]:** This section should contain a clear description of how results will be made sharable throughout the CTS program, and how the fruits of the program can be made available to other end users.
- L. Facilities [1 page]:** Include here a description of the facilities (including facilities of teaming partners/subcontractors) that would be used for the proposed effort.
- M. Security Plan [3 pages]:** State what level of security is required to carry out the proposed effort. If access to classified data is required, provide information specific to secure facilities, including subcontractors, if any. Include the clearances in place for personnel carrying out tasks on the proposed project. Discuss any limitations

foreseen. State procedures and data storage and computation resources for handling ITAR-restricted data.

- N. **Experience [3 pages]**: This section describes relevant capabilities, accomplishments, and work in video understanding and surveillance, or closely related areas, by the prime contractor as well as each subcontractor.
- O. **Key Personnel [1 page]**: Include a listing of key personnel, including subcontractors along with the amount of effort to be expended by each person during each calendar year. If multiple proposals are being submitted in response to this BAA, indicate how the efforts will be staffed if multiple awards are made.
- P. **Qualifications [1 page per key person]**: Include a concise summary of the qualifications of listed key personnel and subcontractors, along with other major sources of support for them. *(Reminder: This section is not included in the page limit.)*
- Q. **References**: Include a bibliography of relevant technical papers and research notes that support the technical ideas in this proposal. Provide www links, where possible. *(Reminder: This section is not included in the page limit.)*

### 8.7 Volume II Format

The Cost Proposal will be submitted in the following format:

- Page size set at 8.5 x 11 inches
- Margins no less than 1 inch
- Page numbers inserted on lower right
- Type size of text will be 10 points
- Limit of 2 Megabytes

### 8.8 Guidance on Cost Proposal

The cost proposal should provide for a phased program over the duration of the project, supported by detailed breakdowns.

The Cost Proposal Cover must include the words “Cost Proposal” and will otherwise be identical to the Volume I cover page. [ref. Attachment 2].

#### A. **Budget Summary [2 pages]**:

Part 1. Detailed breakdown for all costs by Calendar Year (1 page):

1. Labor hours by labor category / tasks and subtasks; optional tasks / subtasks must be listed individually.
2. Personnel (name or designation, rate, percent of time on project, and other miscellaneous expenses, such as benefits/overhead rate
3. Proposed contractor acquired Information Technology Resources [ref: Attachment 3]

4. Travel expense estimates.
5. Other direct / indirect costs.
6. Materials

**B. Cost Breakdown by Task [1 page]:**

1. Cost Breakdown by task/sub-task, using the same task numbers as in the Technical Proposal SOW (Vol. I, Section G). Options should be costed individually and separately from the base effort.
2. Information Technology (IT) (ref. Attachment 3) Resource Purchase Information. Contractors requiring the purchase of information technology resources as Government Furnished Property (GFP) MUST attach to the submitted proposals the following information:
  - A letter on corporate letterhead signed by a senior corporate official and addressed to Dr. Thomas M. Strat, Program Manager, DARPA/IXO, stating that the organization either cannot or will not provide the IT resources necessary to conduct the said research.
  - An explanation of the method of competitive acquisition or a sole source justification, as appropriate, for each IT resource item.
  - If the resource is leased, a lease/purchase analysis clearly showing the reason for the lease decision.
  - The exact cost for each IT resource item.

**C. Budget Details:** Include any other relevant details that support Section B.1 above.

**8.9 Reporting Requirements: Technical-Financial Information Management System (T-FIMS)**

The T-FIMS Interactive reporting system facilitates technical and expenditure reporting on line. Information on this system may be found at URL: <http://www.tfims.darpa.mil> Offerors shall incorporate the following T-FIMS reporting requirements into their project schedule and deliverables:

- I. Monthly T-FIMS Financial Report (incurred and invoiced data)
- II. Quarterly Reports: Due the 15<sup>th</sup> of months January, April, and October; and an extended quarterly report due the 15<sup>th</sup> of July.
  - a. Technical Report (include all sections that are applicable, for each quarterly report)
    - i. Verify General Information
      1. Organization, PI, Project Title, Agent, Contract No.
    - ii. Include Technical Approach
      1. Goals

- 2. Accomplishments
      - 3. Significant advances/changes
    - iii. Include Deliverables
    - iv. Include Transition Plan
    - v. Include Publications
    - vi. Include Meetings and Presentations
    - vii. Include Project Plans
    - viii. Include Near-term Objectives
  - b. Financial Report
  - c. Project Status/Schedule
- III. Extended Requirements for July Report:
- a. All Sections of the Status Report
  - b. QUAD Chart
    - i. Visual Graphic
    - ii. Impact
    - iii. New Technical Idea(s)
    - iv. Schedule
  - c. Financial Data
    - i. Date anticipated for 75% \*Obligation of funds
    - ii. Date anticipated for 100% Obligation of funds
    - iii. Amount required for next funding increment on this effort (contract)

## **9.0 PROPOSAL DELIVERY SCHEDULE**

Proposals must be uploaded no later than 1600 (EST), 13 May 2003 to be considered for the first round of funding. BAA 03-15 will be open until 25 March 2004. Proposals submitted under this BAA after the above referenced date will be accepted, but will not be considered for the first round of funding. Please reference <http://www.darpa.mil/ixo/solicitations/cts/index.htm> for complete submission instructions.

## **10.0 PROTECTION OF INFORMATION**

It is the policy of DARPA to treat all proposals as competitive information and to disclose contents only for the purposes of evaluation and assessment. The Government may use selected support contractor personnel from Schafer Corporation, DynCorp Systems & Solutions LLC, SET Associates, and McNeil Technologies to assist in administrative functions only. Those contractors sign binding, non-disclosure agreements with DARPA.

## **11.0 TECHNICAL AND ADMINISTRATIVE INQUIRIES**

Technical, contractual, or administrative questions should be emailed to [baa03-15@darpa.mil](mailto:baa03-15@darpa.mil). Answers to all questions generally relevant to the technical, contractual and administrative aspects of the solicitation will be posted on the FAQ for public access.

## **12.0 OTHER IMPORTANT ADMINISTRATIVE INFORMATION**

The Government reserves the right to select for award all, some, or none of the proposals received in response to this announcement. All responsible sources may submit a proposal that shall be considered by DARPA. Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals and team with others in submitting proposals. However, no portion of this BAA will be set aside for HBCU and MI participation, due to the impracticality of reserving discrete or severable areas of technology for exclusive competition among these entities.

Government contractors are required to register at the Government's Central Contractor Registration site in order to negotiate contracts with most government agencies. This URL is provided as a reference: <http://www.ccr.gov>.

Since this PIP, along with the FedBizOpps Announcement, constitutes a Broad Agency Announcement as contemplated in the FAR 6.102 (d)(2)(i), all prospective Offerors MUST also refer to this PIP before submitting a proposal.

DARPA anticipates that initial contractor selections will be made during the fourth quarter of fiscal year 2003.

### 13.0 ACRONYMS

BAA	Broad Agency Announcement
COTS	Commercial off-the-shelf
CPFF	Cost Plus Fixed Fee
CR	Cost Reimbursement
CRR	Central Contractor Registration
CTS	Combat zones That See
CY	Calendar Year
DARPA	Defense Advanced Research Projects Agency
DIRO	Directors Office (DARPA)
DO	Delivery Order
DoD	Department of Defense
FAQ	Frequently Asked Questions
FAR	Federal Acquisition Regulations
FP	Force Protection
FY	Fiscal Year
GOTS	Government off-the-shelf
GUI	Graphical User Interface
HBCU	Historically Black Colleges and Universities
IR	Infrared
ITAR	International Traffic in Arms Regulations
IXO	Information Exploitation Office
LIC	Low Intensity Conflict
MI	Minority Institutions
MOUT	Military Operations in Urban Terrain
MPA	Motion Pattern Analysis
OCONUS	Outside Continental United States
OOTW	Operations Other than War
PIP	Proposer Information Pamphlet
SI	System Integrator
SOW	Statement of Work
T-FIMS	Technical-Financial Information Management System

## **14.0 ATTACHMENTS**

**14.1 Attachment 1: Volume I Cover Page**

**14.2 Attachment 2: Volume II Cover Page**

**14.3 Attachment 3: Definition of Information Technology**

**Attachment 1: Volume I Cover Page**

**BAA 03-15  
Technical Proposal**

**DARPA Combat zones That See Program**

**PROPOSAL TITLE**

**Name of Lead Organization  
Type of Business**

<p>Technical Point of Contact Name, Title Surface Mail Address Phone/Fax Email Address</p> <p>Administrative Point of Contact Name, Title Surface mail Address Phone/Fax Email Address</p> <p>*Accounting Contact Name, Title Phone/Fax Email Address</p>	<p>Sub-contractor/teaming members:</p>
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**Duration of Effort: N Months (basic effort), N Months (optional effort)**

**Proposed Cost:**

Year		**CY03	CY04	CY05	
	Months	Feb-Jan	Feb-Jan	Feb-Jan	
	Base	\$NNN	\$NNN	\$NNN	\$Total base
	Options	\$NNN	\$NNN	\$NNN	\$Total options
	Total Cost				\$Total cost

\*Name of lead organization POC responsible for tracking and submitting invoices and expenditure information.

\*\*CY = Calendar Year

**Appendix 2: Volume II Cover Page**

**BAA 03-15  
Cost Proposal**

**DARPA Combat zones That See Program**

**PROPOSAL TITLE**

**Name of Lead Organization  
Type of Business**

<p>Technical Point of Contact Name, Title Surface Mail Address Phone/Fax Email Address</p> <p>Administrative Point of Contact Name, Title Surface mail Address Phone/Fax Email Address</p> <p>*Accounting Contact Name, Title Phone/Fax Email Address</p>	<p>Sub-contractor/teaming members:</p>
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**Duration of Effort: N Months (basic effort), N Months (optional effort)**

**Proposed Cost:**

Year		**CY03	CY04	CY05	
	Months	Feb-Jan	Feb-Jan	Feb-Jan	
	Base	\$NNN	\$NNN	\$NNN	\$Total base
	Options	\$NNN	\$NNN	\$NNN	\$Total options
	Total Cost				\$Total cost

\*Name of lead organization POC responsible for tracking and submitting invoices and expenditure information.

\*\*CY = Calendar Year

### **Attachment 3: Definition of Information Technology**

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