STO
Strategic Technology Office

Proposers Day

Comprehensive Interior Reconnaissance (CIR)

Joseph Durek
Program Manager

30 April 2009

Introductions

Strategic Technology Office

Government

Joe Durek	DARPA	Program Manager
Tina Stuard	DARPA	Contracting Officer
James Wilcoski	CERL, ERDC	Contracting Officer's Representative
Speler Montgomery	GSL, ERDC	SME, Building Construction

Support Staff

Joanna Chaomalaguti	DARPA (CACI)	Program Security
Gloria Phelps	DARPA (CACI)	Program Security
Gordon Miller	DARPA (ANSER)	SETA
Michael Papazoglou	DARPA (BAH)	SETA
Seelig Sinton	DARPA (BAH)	SETA

Agenda
Morning: BAA Review

- 0730 Check-in
- 0830 Start Unclassified Proposer Day Session
  - Welcome — Joe Durek
  - Contracting — Tina Stuard
  - Technical — Joe Durek
  - Security — Joanna Chao
  - Foreign Building Synopsis — Speler Montgomery
  - Concluding Remarks — Joe Durek
- 1045 End Unclassified Session
- 1045 Prepare room for classified session
- 1100 - 1200 Classified session
- 1300 - 1700 Sidebars with PM

DARPA-BAA-09-38
Comprehensive Interior Reconnaissance (CIR)

Contracting
Tina Stuard

Solicitation is released utilizing Broad Agency Announcement procedures IAW FAR 35.016

- ELEMENTS OF THE BAA
  - Synopsis in FEDBIZOPPS
  - “Add to Watch List” to get any update notices
- TIME PERIOD(S) –
  - BAA is open through 30 Mar 2010
  - Initial proposals due 29 May 2009
  - Proposals received after 29 May 2009 will be evaluated/selected based on availability of subsequent program funding

BAA PROCESS

CMO

- ELIGIBILITY
  - All interested/qualified sources
  - Foreign participants/resources may participate to the extent authorized by applicable Security Regulations, Export Laws, etc.
  - Government agencies/labs, FFRDC's, are subject to direct competition limitations and cannot respond unless they demonstrate work is not otherwise available and cite the specific statutory authority
  - Teaming is encouraged and the expectation is one unified proposal per team is submitted

BAA PROCESS

CMO

- PROPOSAL PREPARATION/SUBMISSION
  - Instructions are detailed in the BAA (**Follow closely**)
  - **ALL** questions to DARPA-BAA-09-38@darpa.mil
  - Funding instruments = primarily contract(s) and other transactions, no assistance instruments (grants, cooperative agreements)
- Assert rights to **all** technical data & computer software generated, developed, and/or delivered to which the Government will receive less than Unlimited Rights
  - Assertions that apply to Prime and Subs
  - Use defined “Basis of Assertion” and “Rights Category”
  - **Justify** “Basis of Assertion”
  - **This information is assessed during evaluations**

BAA PROCESS

CMO

- Volume I Technical/Management Proposal
  - Mind Page Limitations (**don't use Cost Prop for overflow)**
  - SOW (by phase, WBS, milestones, deliverables, exit criteria)
  - Don't forget to address the addendum
- Volume II Cost Prop
  - Provide **all** Cover Page info
  - FAR Part 15.4/Table 15-2 (suggested format/content)
  - Provide BOE(s) to support proposed costs (labor & material)
  - **Include all** subcontract proposals

Following the proposal instructions assists the evaluation team to clearly understand what is being proposed.

Following the proposal instructions supports a timely negotiation.

BAA PROCESS

CMO

- EVALUATION/AWARD
  - Government reserves the right to select for award all, some, or none of the proposals received.
  - Government anticipates making multiple awards
  - No common Statement of Work - Proposals evaluated on individual merit and relevance as it relates to the stated research goals/objectives rather than against each other
  - Once selections are made, proposals are provided to the Contracting Officer in preparation for negotiations
  - Only authorized Contracting Officer may obligate the Government

BAA PROCESS

CMO

- COMMUNICATIONS
  - Prior to receipt of proposals – No restrictions, however Gov't (PM/PCO) shall not dictate solutions or transfer technology

    After Receipt of Proposals – Government (PM/PCO) may communicate with offerors in order to understand the meaning of some aspect of the proposal that is not clear or to obtain confirmation or substantiation of a proposed approach, solution, or cost estimate
  - Informal feedback may be provided once selection(s) are made

DARPA-BAA-09-38
Comprehensive Interior Reconnaissance (CIR)

Technical
Joe Durek

Problem Definition

- Our adversaries have adopted asymmetric strategies such as hiding in and operating out of civilian buildings.
- To reduce the tactical risk to U.S. Forces, it is imperative that we develop technologies to allow U.S. Forces to ***confidently maneuver*** within building interiors.
- Such capabilities are expected to provide a significant contribution throughout the operational timeline from planning through execution.
- DARPA's objective is to develop broad and diverse technologies that will ***reverse the adversaries' advantage*** of urban familiarity and sanctuary and provide U.S. Forces with complete above- and below-ground awareness.

Complete Awareness

Information required to “confidently maneuver”

- Building Underground Extent
  - Basements
  - Underground Connectivity

Situational awareness of the urban subsurface

- Building Layout
  - Stairwells
  - Wall Layout

Understanding of where adversaries may approach from

Awareness Provided by Opportunistic Sensing

DARPA Asserts that:

- Building infrastructure can relay tactically useful information about the interior layout. (infrastructure includes, but is not limited to, structure, electrical, plumbing, and ventilation systems)
- Such information may be acquired through access to the exterior of buildings ... but does not require contact or deployments within the building.
- Such information may require active as well as passive sensing.
- Multiple approaches may be required to provide complete building interior awareness.
- A mission is expected to depend upon an optimal mix of technologies determined by the specific environment.

Example of Awareness Available using Exterior Observations

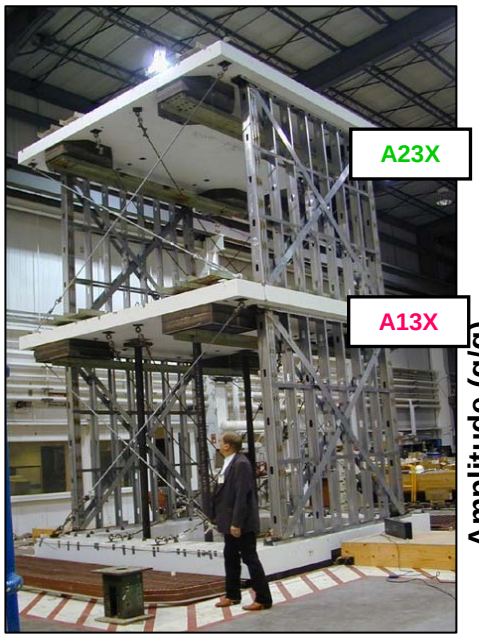
Building Dynamics are dictated by the building structure

$$u(r,t) = \sum_k F(x,t) G_k(x,r,\omega_k) e^{i\omega_k t}$$

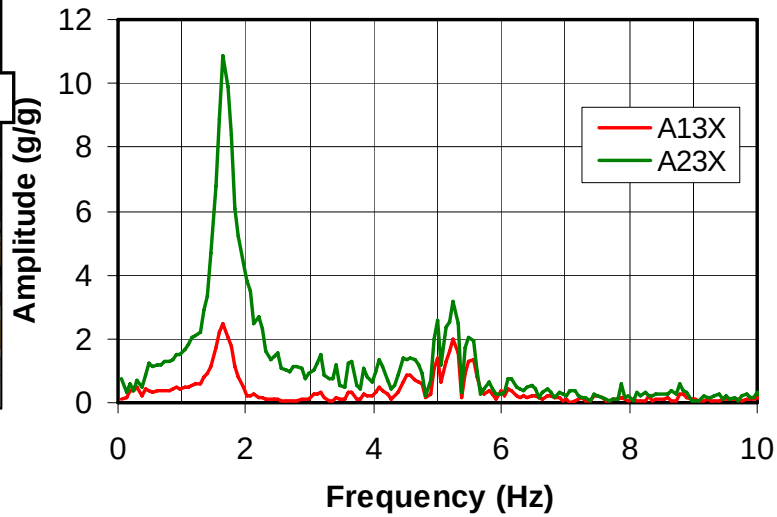
building motion

applied forces

resonances



- Building motion is the sum of excited building resonances
- Resonances are related to interior wall structure



Breadth of Technology Approaches

- DARPA identified multiple individual sensing technology concepts
  - Exploit opportunistic sensing
  - Used to demonstrate a robust technology foundation to support initiation of the CIR program
  - Will not be released by DARPA

- The building resonance example was
  - Shown only to exemplify the relationship between external observations and interior layout
  - Presented without endorsement or prejudice.

Funding Opportunity Description

- DARPA is soliciting *innovative* research proposals in the area of opportunistic sensing for overseas urban building interior awareness using exterior observations.

- Proposed research should investigate *innovative* approaches that enable revolutionary advances in science, devices, or systems.

- Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

DARPA's Goal

- Investigate and validate multiple Sensing Technology concepts that address all program metrics.
  - An end-to-end process consisting of
    - the signature of interest (related to a CIR User Objective),
    - the transducer technology
    - the transmission path to the building exterior,
    - the capture and interpretation of the signature, and
    - the interface that displays the information to the user.
- Proposed Sensing Technologies must have a path to operationally viable and environmental robustness.
  - limit eventual SWaP and logistical tails.
  - Address the expected type and deployment of sensors needed to provide adequate resolution and resolve ambiguities, including:
    - Scalability
    - Assumptions
    - Stand-off
    - Number and geometry of sensors

Acceptable Proposals

- DARPA will develop diverse technologies against all Objectives and Metrics
- Sensing Technologies must address ***all*** Objectives
- External through-the-wall radar solutions are discouraged

Concept Development and Validation

- Validate the proposed Sensing Technology concept and predict quantitative performance using modeling, simulation, and focused data collections.

- The Performer will:
  - Provide a test plan to support validation
    - Government will approve
    - User selected test buildings
  - Characterize performance
  - Generate system design to achieve stated performance

Program Phasing
Phase 1 (Continued)

- The minimum expected deliverables are:
  - Performer test plan (to be approved by DARPA)
  - Concept System Design w/ CONOPS
  - Monthly performance and financial reports
  - Quarterly reviews (including kick-off and final review)
  - Final Report
  - Updated Phase 2 technical and cost proposal

- Promising Sensing Technologies to be eligible for transition into Phase 2

Non-Real Time Functional Demonstration System

- Develop and demonstrate the Sensing Technology concept using a functional (non-real time, non-SWAP) prototype against a government provided multi-story building.

- The Performer will:
  - Design and build demonstration hardware and software
  - Perform phenomenology experimentation
  - Define algorithm and computational requirements.
  - Develop the full sensor data collection system
  - Demonstrate exploitation of collected sensor data
  - Develop a display interface for building layout information
  - Conduct a data collection experiment on known building
  - Conduct a blind experiment on unknown building

Program Phasing
Phase 2 (continued)

- The minimum expected deliverables are:
  - System Architecture Document
  - Field Test Demonstration Plan Document
  - Validated functional prototype
  - Monthly performance and financial reports
  - Quarterly reviews (including kick-off and final review)
  - Final Report

- For planning purposes:
  - National Training Center at Fort Irwin, CA
  - Fort Bragg, NC

Program Metrics

Category	Objective	Phase I Concept Viability	Phase II Performance Demonstration	Notional System
Information Needs				
Building Extent	Basements (including underground buildings)	Detected Pd > 75% Pfa < 20% Anomalous vertical / lateral extent	Same as Notional System Metric	Detected Pd > 90% Pfa < 10% Number of floors Lateral volume >20% different than footprint
	Underground connectivity (cross section > 1m^2)	Egress identified Pd >75% Pfa < 20% Connected Building Identified	Same as Notional System Metric	Egress identified Pd > 90% Pfa < 10% Connected building identified
	Building Layout (above- and below-ground)	Same as Notional System Metric	Same as Notional System Metric	Wall location error < 1 m Stairwell Location within Quadrant
Additional Information Needs are in the classified appendix.				

Program Metrics (continued)

Category	Objective	Phase I Concept Viability	Phase II Performance Demonstration	Notional System
System Attributes				
Building Environment		Same as Notional System Metric	Same as Notional System Metric	Building: Up to 10 story furnished w/ 2 level basement in high-density urban block, with 8 in walls of concrete, rebar, brick, or adobe. • Interior walls may be in-fill concrete or dry wall w/studs. • Periodically occupied, with movement to all floors/rooms
Blue Force Exposure		n/a	Same as Notional System Metric	No personnel < 10 m of exterior No personnel < 20 m for > 5 min
Time to Achieve Metrics		n/a	n/a	Within 3 days of sensor deployment
Stationary Sensors (as applicable)		n/a	n/a	Carried and deployed by one person with a backpack, compatible with clandestine operations
Vehicle Platform (as applicable)	Vehicle-Borne Sensors	n/a	n/a	1 square meter, within vehicle length; Required power contained within vehicle Processing units, required power contained within vehicle SWAP
Airborne Sensors (as applicable)		n/a	n/a	Consistent with SWAP of proposed platform
Additional Information Needs are in the classified appendix.				

Request Application Package

- Full packet
  - DARPA-BAA-09-38 Mod 1 (Unclassified)
  - DARPA-BAA-09-38 Appendix (SECRET)
  - DD254 (Unclassified)
  - DARPA-CG-545 Revision 2 (FOUO)
  - DARPA-CG-545 Appendix (SECRET)
- Instructions for requesting are in the BAA.
  - Send an email to DARPA-BAA-09-38@darpa.mil

Security and Proprietary Issues

- Proposals will be SECRET
- Cost volume must be unclassified
- Mark all material appropriately
- Proprietary data
  - Mark cover and each page.
  - Clearly show what is proprietary

Content and Form of Submission

- Proposal Information
  - BAA is open for 1 year (thru 30 Mar 10)
  - Due date for initial round of selection is: 29 May 09
  - Administrative correspondence to
    - DARPA-BAA-09-38@darpa.mil
    - Unclassified fax: 703-812-3307
    - DARPA/STO
      ATTN: DARPA-BAA-09-38
      3701 North Fairfax Drive
      Arlington, VA 22203-1714

Submission Dates and Times

- For initial round of selections:
  - Proposal (1 hardcopy and 2 electronic (pdf) on CDROM)
  - Submitted to
    DARPA
    ATTN: STO
    Reference: DARPA-BAA-09-38
    3701 North Fairfax Drive, Arlington
    VA 22203-1714
  - If classified, the material should be appropriately packaged with the outer envelope addressed to:
    Defense Advanced Research Projects Agency
    Security & Intelligence Directorate, Attn: CDR
    3701 North Fairfax Drive
    Arlington, VA 22203-1714
  - Received by 4:00 PM on 29 May 09
- For other submissions
  - Received after the above
  - Will be evaluated and may be selected
- DARPA will acknowledge by email and assign a control number

Evaluation Criteria

- Evaluation will be through a review of each proposal using the following criteria, in order of descending importance:
  - Ability to Meet Program Go/No-Go Metrics
  - Overall Scientific and Technical Merit
  - Potential Contribution and Relevance to the DARPA Mission
  - Realism of Proposed Schedule
  - Proposer's Capabilities and/or Related Experience
  - Plans and Capability to Accomplish Technology Transition
  - Plans and Capability to Accomplish Technology Transition
  - Cost Realism

- Technical & Management proposal evaluated for Phase 1 & 2
- Cost proposal evaluated for Phase 1 & 2

Evaluation Criteria
Ability to Meet Program Go/No-Go Metrics

- The proposal clearly explains the technical approach(es) that will be employed to meet or exceed the *program metrics* listed in Table 1, page 11 and the classified appendix.

- The *feasibility and likelihood* of the proposed approach for satisfying the program go/no-go metrics are explicitly described and clearly substantiated.

- The proposal reflects a mature and quantitative *understanding* of the performance go/no-go metrics, the statistical confidence with which they may be measured, and their relationship to the concept of operations that will result from successful performance in the program.

Evaluation Criteria
Overall Scientific and Technical Merit

- The proposed approach is feasible, achievable, and complete.
- 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 clearly identifies major technical risks and planned mitigation efforts and provides ample justification as to why the approach(es) is / are feasible.
- Ensure the technical description includes:
  - A description of the underlying *physics of the signature*, whether measured passively or actively
  - A description of the *technical rationale* for measuring and exploiting the signature
  - A quantification of the *expected collection requirements* including sensing geometry and dwell time
  - An identification of any *assumptions* involving building design and construction which, if inaccurate, will affect the achievable performance

Evaluation Criteria
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.

Evaluation Criteria
Realism of Proposed Schedule

- The proposer's abilities
  to aggressively pursue performance metrics
  in the shortest timeframe and
  to accurately account for that timeframe will be evaluated,

  as well as proposer's ability to *understand, identify, and mitigate any potential risk* in schedule.

Evaluation Criteria
Proposer's Capabilities and/or Related Experience

- The proposer's assembled *technical team* that has the expertise and experience to accomplish the proposed tasks as referenced in Section 4.3.1, Section III, Detailed Proposal Information, on page 17.
- The proposer's *prior experience* in similar efforts clearly demonstrates an ability to deliver products that meet the proposed technical performance within the proposed budget and schedule.
- The proposed team's expertise to *manage the cost and schedule* will be evaluated.
- Similar efforts completed/ongoing by the proposer in this area are fully described including identification of other Government sponsors.

Evaluation Criteria
Plans and Capability to Accomplish Technology Transition

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

Evaluation Criteria
Cost Realism

- ... 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.
- ... principally measured by cost per labor-hour and number of labor-hours proposed, but will also include evaluation of the labor resources assigned to complete major technical tasks.
- ...recognize 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 and a low-cost proposal which does not assign sufficient resources and technical resources* to achieve the proposed objectives may be evaluated poorly for unnecessary risk.
- ... 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.

Review and Recommendation Process

- DARPA will select source whose offeror meets the Government technical, policy and programmatic goals
- Primary basis for selecting proposals will be
  - technical,
  - importance to DARPA programs, and
  - fund availability.
- Government personnel will conduct review
- Proposals may be handled for administrative purposes by support contractors.
- Input on technical aspects may be solicited by DARPA from non-Government consultants/experts (under non-disclosure agreements).
- Proposals will not be returned.

DARPA-BAA-09-38
Comprehensive Interior Reconnaissance (CIR)

Security Overview

Joanna Chaomalaguti
Program Security Representative
Strategic Technology Office (STO)
(571) 218-4974 voice/STE
(703)-248-1910 Fax
(703) 526-4749/4750 Secure Fax
joanna.chaomalaguti.ctr@darpa.mil

Gloria Phelps
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Strategic Technology Office (STO)
(703) 526-4034 voice/STE
(703)-248-1910 Fax
(703) 526-4749/4750 Secure Fax
gloria.phelps.ctr@darpa.mil

Security Overview

- Introduction
- Security Oversight
- Security Classification Guidance
- Public Release
- Questions

Security Oversight

DARPA is responsible for the following:

- Issuing the DD254 (Prime Contractors)
  - Prime contractors issue 254 for subcontractors
- The security oversight of the Comprehensive Interior Reconnaissance (CIR) program
  - Example: Security Class Guide, security incidents (24-hr notification), destruction of material, and program close-out)

DSS has security cognizance over contractor facilities

- Facilities, classified computer systems and personnel security clearances

Security Guidance

- All security guidance pertaining to this effort are derived from
  DARPA Security Classification Guide – 545 Rev2.
  - Purpose, Authority, and Classification Recommendations

Public Release

- All information pertaining to the CIR program and all DARPA efforts must be approved by DARPA prior to public release

  (Please refer to the DD254, SCG and BAA for further guidance)

  Procedures:

  - Request submitted to DARPA
  - DARPA sends to Technical Information Office (TIO) for approval
    - TIO approves/denies request
    - Contractor is informed of response

Additional Items

- Proposal packages are due to DARPA NLT 4pm EST on 29 May 09
- All classified (appendix) material mailed to each location must be sent back to DARPA immediately after the award of the contract or provide security with a destruction certificate to verify.

- Please forward properly wrapped and marked package to:

Inner Envelope

DARPA
Security and Intelligence Directorate
ATTN: CDR
3701 North Fairfax Drive
Arlington, VA 22203

Outer Envelope

DARPA
ATTN: STO
Reference: DARPA-BAA-09-38
3701 North Fairfax Drive
Arlington, VA 22203-1714

Extracts from Draft SCG

ELEMENT	CLASS & REASON	REMARKS
1. General/Programmatic/Funding		
l. CIR information describing a breakthrough or a significant technological advance	S 1.4(e)	
n. Detailed or specific description of CIR elements or components revealing limitations or vulnerabilities that can be exploited to defeat the CIR system	S 1.4(e)	
2. Research/Design/Performance Capabilities		
a. Unique signatures associated with building layout and underground extent.	U-S 1.4(e)	See Appendix A
b. CIR sensing technology approach that is vulnerable to counter-measures	S 1.4(e)	
c. CIR system effectiveness parameters	U-S 1.4(e)	SECRET if related to 2a above.
d. Design, test, and evaluation data revealing details of engineering, construction, or fabrication techniques unique or essential to CIR program technology	S 1.4(e)	
e. Information revealing limitations in technology that lead to a degradation or reduced capabilities of the CIR system	S 1.4(e)	Any technology approach that can be readily countered is SECRET.

Extracts from Draft SCG

ELEMENT	CLASS & REASON	REMARKS
3. Demonstrations/Tests/Experiments		
c. CIR operational system performance capabilities	U-S 1.4(e)	SECRET if related to 2a above.
e. Detailed findings for demonstrations, tests, and experiments that, if revealed, could identify weaknesses or vulnerabilities to the entire CIR system that would render the system inoperable	S 1.4(e)	
4. Threat/Survivability/Vulnerability		
a. Technical details of specific CIR technology that reveal a vulnerability of the system	S 1.4(e)	
b. Key vulnerabilities, weaknesses, and technology shortfalls of the CIR system	S 1.4(e)	
c. Specific survivability weaknesses of the CIR system that technology cannot resolve, are inherent in a deployed mode, and degrade mission effectiveness	S 1.4(e)	

Questions?

Joanna Chaomalaguti
571) 218-4974 voice/STE
(703)-248-1910 Fax
(703) 526-4749/4750 Secure Fax
Joanna.chaomalaguti.ctr@darpa.mil

Agency Contacts

- Administrative, technical, or contractual questions
  - Email to DARPA-BAA-09-38@darpa.mil
  - Fax to 703-812-3307

- Technical POC
  - Dr Joseph Durek

DARPA-BAA-09-38
Comprehensive Interior Reconnaissance (CIR)

Questions