

Broad Agency Announcement Solicitation HSHQDC-15-R-B0008

Amendment 1

Project: Assured Timing for Critical Infrastructure

1. Introduction

- 1.1 This BAA solicitation (HSHQDC-15-R-B0008) is a call issued against Department of Homeland Security (DHS), Science & Technology (S&T), Resilient Systems Division (RSD), 5-Year Broad Agency Announcement (BAA), HSHQDC-15-R-B0002. All terms and conditions of the DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002 apply to this solicitation unless otherwise noted herein.
- 1.2 One of DHS S&T's Visionary Goals is titled Resilient Communities: Disaster-Proofing Society. This goal specifies that critical infrastructure be designed, built, and maintained to withstand naturally occurring and man-made disasters. Decision makers will have the ability to know when a disaster is coming; anticipate potential effects, and use already-in-place or rapidly deployable countermeasures and mitigation techniques to shield communities from negative consequences.
- 1.3 The First Responder's Group manages DHS S&T's critical infrastructure projects and applies physical science to improve detection, analysis, and understanding of risks posed to the Nation by exigent threats, vulnerabilities in existing critical infrastructure and assets, and consequence analysis, in an effort to support the preparedness, response, and recovery of communities impacted by catastrophic events; and to advance national security by integrating scientifically-derived knowledge into homeland security policies and technologies.
- 1.4 Position, Navigation, and Timing (PNT) data services are critical to the operations of multiple critical infrastructure sectors, such as communication and transportation. As the Nation's critical infrastructure assets, networks, and systems have become much more interdependent across vast regions, crossing jurisdictional/national boundaries and time zones, the need for accurate and precise PNT services is vital to the continued functioning of infrastructure. The 16 critical infrastructure sectors' increased dependency on timing services leaves them potentially vulnerable to disruption; the potential severity of impacts and possible cascading effects from denial of timing services has not been fully explored.
- 1.5 National Security Presidential Directive-39 (NSPD-39: 2004) requires DHS to develop backup capabilities to mitigate Global Positioning System (GPS) disruptions in coordination with the Department of Transportation, and "identify space-based positioning, navigation, and timing requirements for homeland security purposes to the Secretary of Transportation, and coordinate the use of positioning, navigation, and timing capabilities and backup systems for homeland security purposes by Federal, State, and local governments and authorities." [1]
- 1.6 DHS S&T has identified the need for assured PNT as a key programmatic goal. This work will initially focus on the timing portion of PNT services used throughout critical infrastructure. DHS S&T seeks to assess the impact of timing disruption, corruption, or

loss of signal on critical infrastructure assets and networks through three specific focus areas:

- 1.6.1 The development of low cost assured timing technologies, including the design and demonstration of any applicable technologies, which can provide secure and robust timing inputs to critical infrastructure
- 1.6.2 To identify and thoroughly assess both short- and long-term (30+ days) impacts to key critical infrastructures when timing is tampered with, incorrect, denied, or otherwise unavailable,
- 1.6.3 To develop effective detection capability of timing issues specific to critical infrastructure that can be easily integrated into existing operations.

2. Project Description/Scope

- 2.1 The Assured Timing for Critical Infrastructure project includes three complementary Technical Topic Areas (TTAs):
 - 2.1.1 TTA #1, Development of Assured Timing Technologies
 - 2.1.2 TTA #2, System-Level Testing & Analysis to Understand Impacts
 - 2.1.3 TTA #3, Development of Timing Manipulation Detection Capabilities
- 2.2 TTA #1 will develop assured timing technologies for critical infrastructure, including prototype development and testing that can provide robust timing inputs to critical infrastructure.
- 2.3 TTA #2 seeks to provide a fundamental baseline understanding of the risk profile of timing disruptions to critical infrastructure through system-level testing and analysis to understand both short- and long-term (30+ days) impacts of undetected manipulation or denial of timing service disruptions to key critical infrastructures.
- 2.4 TTA #3 will develop detection capabilities for timing issues specific to critical infrastructure including prototype testing and results, which can be easily integrated into existing operations.
- 2.5 Each TTA is discussed in detail below and specific objectives for each TTA are also provided. Of particular note, it is anticipated that both metrics and analysis techniques to measure the development progress will evolve during the project.

3. Technical Topic Areas

3.1 TTA #1: Development of Assured Timing Technologies

- 3.1.1 This TTA seeks to develop new concepts and technologies and/or advance existing technologies for assured timing for fixed critical infrastructure. Fulfillment of this

TTA requires demonstration of concepts and ability to provide robust timing for critical infrastructure-type requirements and applications.

3.1.1.1 System performance objectives are to be equivalent or better to the capability provided by GPS in terms of accuracy, availability, continuity & integrity. The minimum timing objective is 1 microsecond.

3.1.1.2 The proposed concept/technology solution may be at the local, regional, or wide-scale level.

3.1.1.3 The end product should be low-cost and easily integrated into existing critical infrastructure operations.

3.1.1.4 An initial project management plan is due fifteen (15) days after award. Offerors must include personnel, test facilities & capabilities, and initial project timelines in the plan.

3.1.2 Section 4.1 below identifies key deliverables for this TTA.

3.2 TTA #2: System-Level Testing & Analysis to Understand Impacts

3.2.1 To fully understand the risk profile of timing disruptions to critical infrastructure and potential impacts to the Nation, system-level testing and analysis are required. Measurement and analysis tools are required to test the impacts of potential timing vulnerabilities in current critical infrastructure in a test-bed environment to analyze the possible consequences of cascading effects as timing disruptions impact specific critical infrastructure assets and systems.

3.2.1.1 Subcomponent-level testing of critical infrastructure elements in a test-bed environment is required to quantify the impacts of timing. Efforts funded under this TTA will be expected to deliver periodic and final reports documenting all results of sandbox-environment testing and analysis to project real-world short-term and long-term impacts, consequences, and other cascading effects to critical infrastructure in the tampering with, denial of, or unavailability of timing.

3.2.1.2 The testing and analysis results should provide reasonable results delivered in the manner of periodic and final reports documenting all reasonable and probable impacts that timing disruptions could effect upon critical infrastructure.

3.2.1.3 An initial project management plan is due fifteen (15) days after award. Offerors must include personnel, test facilities & capabilities, and initial project timelines in the plan.

3.2.2 Section 4.2 below identifies key deliverables for this TTA.

3.3 TTA #3: Development of Timing Manipulation Detection Capabilities

- 3.3.1 Timing signal disruptions can originate from any number of potential vectors, whether intentional or unintentional, or from one site or multiple sites. Timing manipulation may not be immediately detected until the effects of timing signal disruption are already underway. Even then, timing manipulation may not be identified by the signal itself, but by the effects of the disruption.
- 3.3.2 Using existing critical infrastructure tools, facilities, networks, and assets, owners/operators would benefit from the development of detection methodologies and/or capabilities that would enable identification of timing signal manipulation as it is occurring, giving them situational awareness and allowing them the ability to initiate mitigation actions. These methodologies must be effective in rapidly identifying when timing signals have been manipulated, as well as be easily integrated into current and existing operations methods.
- 3.3.3 An initial project management plan is due fifteen (15) days after award. Offerors must include personnel, test facilities & capabilities, and initial project timelines in the plan.
- 3.3.4 Section 4.3, below, identifies key deliverables for this TTA.

4. Project Structure

The Assured Timing for Critical Infrastructure project is structured into three distinct TTAs that aim to 1) develop and demonstrate assured timing concepts and technologies, 2) provide baseline system-level testing and analysis, and 3) develop timing signal manipulation detection capabilities

4.1 TTA #1 Key Deliverables

The key deliverables required for TTA #1 are:

DELIVERABLES	DUE DATE
Project Management Plan / Initial Testing Plan	15 days after award
Monthly Status Reports on Development of Assured Timing Technologies	Due monthly until end of project
Cumulative Prototype Test Results and Analysis	Quarterly (every 3 months of 18-month award)
Project Final Report – Including all analysis and raw data	18 months after award

4.2 TTA #2 Key Deliverables

Any awards resulting from submissions received under TTA #2 will require periodic status

reports on test results derived from all system-level testing and analysis, including raw data. These periodic reports will be required to both assess system-level testing and analysis deployment efforts to date and help direct testing and analysis efforts for the following period. Also, status reports should document value to the overall effort on timing disruption system-level testing and analysis. Including status reports, the key deliverables required for TTA #2 are:

DELIVERABLES	DUE DATE
Project Management Plan / Initial Testing Plan	15 days after award
Monthly Status Reports on System-Level Testing/Analysis of Timing Disruption Impacts	3 months after award, and due monthly until end of project
Cumulative Test Bed Results and Analysis of Subcomponent Testing	Quarterly (every 3 months of 12-month award)
Project Final Report – Including all analysis and raw data	12 months after award

4.3 TTA #3 Key Deliverables

The key deliverables required for TTA #3 are:

DELIVERABLES	DUE DATE
Project Management Plan / Initial Testing Plan	15 days after award
Monthly Status Reports on Development of Timing Manipulation Detection	Due monthly until end of project
Prototype Testing and Results – Period Report	Quarterly (every 3 months of 18-month award)
Project Final Report – Including all analysis and raw data	18 months after award

5. Project Schedule/Milestones

A notional project schedule is shown below including anticipated meetings and demonstrations.



- Key Deliverable Deadline
- ◇ Interim Reports/Briefings

6. Special Instructions/Notifications

6.1 Response Dates

Event	Time Due	Date or Date Due
White Papers Due	N/A	N/A
Notification of White Paper Evaluation Results	N/A	N/A
Proposals Due	12:00 PM Eastern Time	August 12, 2016

6.2 General Instructions and Information

- 6.2.1 This BAA solicitation (HSHQDC-15-R-B0008) is only seeking the submission of full proposals, subject to the date identified in the “Response Dates” table above. **White papers are not being requested.**
- 6.2.2 Procedures for submission of full proposals in the DHS S&T Portal are provided in paragraph 9 of DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002. Note that offerors must complete the company/organization portal registration PRIOR to submitting a full proposal for the first time. Ensure adequate time to complete the company/ organization registration as delays in this process will not be authorization for late submissions of full proposals. Company/organization registration information is located in paragraph 9.1 of DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002. In addition, each subsequent full proposal requires registration in the portal. Information regarding full proposal registration is located in paragraph 9.2 of DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002.
- 6.2.3 Offerors may provide multiple full proposal submissions; however, each submission must only address one TTA and must be distinct and self-contained without any dependencies on other work of any kind. Each submission must clearly state which TTA is being addressed.
- 6.2.4 All software developed and delivered is required to be subject to security auditing; therefore, the offeror’s technical approach must identify how security auditing will occur. Also, DHS expects offerors to follow best practices on software design and encourages the use of the DHS Software Assurance Marketplace.
- 6.2.5 DHS has a strong preference for open source licensing of software for all software developed and delivered and the licenses for all proposed software deliverables will have to be identified in submitted full proposals. However, as an alternative to open source release, offerors

may also offer a strong technical transition plan for deployment of the technologies developed.

- 6.2.6 As stated in DHS S&T RSD 5-year BAA HSHQDC-15-R-B0002, DHS S&T reserves the right to select for award and to fund all, some, or none of the proposals received in response to this BAA solicitation.
- 6.2.7 The Evaluation Criteria in DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002, [3] Section 10 “EVALUATION OF WHITE PAPERS AND PROPOSALS” applies.

6.3 Foreign Participation

- 6.3.1 Offerors are reminded that foreign participation may occur as defined in DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002, Section 1.3. Therefore, offerors should provide unit costs for any deliverable not anticipated for delivery in a softcopy format.

6.4 Export Control Requirements

- 6.4.1 Offerors are reminded of the export control markings required by DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002, Section 8.5.4 (for proposals).

6.5 Type Classification Ceilings: DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002, describes the Type Classifications for proposals. Specific to this call, the ceiling values for each type are as follows:

- 6.5.1 Type I – Type I awards are limited to a total contract value not to exceed \$3,000,000.00, not including operational evaluation, pilot, and/or transition options.
- 6.5.2 Type II – Type II awards are limited to a total contract value not to exceed \$2,000,000.00, not including operational evaluation, pilot, and/or transition options.
- 6.5.3 Type III – Type III awards are limited to a total contract value not to exceed \$1,000,000.00, not including operational evaluation, pilot, and/or transition options.

6.6 Travel

- 6.6.1 For purposes of estimating costs for full proposals, offerors should anticipate travel to three (3) project meetings per year.

6.7 White Paper Requirements

6.7.1 White papers are not being requested under this Open BAA Call.

6.8 Proposal Requirements

6.8.1 To be considered for award, offerors **MUST** submit a proposal, compliant with the aforementioned response dates, in accordance with the DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002. Submissions not in compliance with DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002 may be rejected (note: the cover page created by the DHS S&T BAA Portal must be included, but does not count against the page count). The DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002, [3] Section 8 discusses proposal preparation and describes the required proposal content; however, in addition to the guidance in Section 8, the following special instructions are added:

6.9.1.1 Maximum Page Count.

6.9.1.1.1 Volume 1 – Technical Proposals.

For any proposal submitted in response to this solicitation/call, Volume 1, the technical proposal, **SHALL NOT** exceed 20 pages. This maximum page count of 20 pages includes **all** information required to be included in Volume 1 of any submitted technical proposal. Information required to be included in Volume 1, Technical Proposal, is outlined in:

- Sections 8.6.1(a) through 8.6.1(v) of DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002, Amendment **and**
- Any additional proposal information required by this solicitation/call (HSHQDC-15-R-B0008).

Notwithstanding any language used in DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002, Sections 8.6.1(a) through 8.6.1(v), such as “appendix”, “resumes”, etc., **all** required information in these sections counts towards the maximum page count of 20 pages. This includes the required “Cover Page”, “Table of Contents”, “Official Transmittal Letter”, “Quad Chart”, “Resumes”, “Assertion of Data Rights”, and so on, identified in Sections 8.6.1(a) through 8.6.1(v) of DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002.

Any Volume 1, Technical Proposal, received in response to this solicitation/call exceeding the maximum page count of 20 pages **WILL NOT BE EVALUATED AND THEREFORE, WILL NOT BE ELIGIBLE FOR AWARD.**

6.9.1.1.2 Volume 2 - Cost Proposals.

THERE IS NO PAGE COUNT LIMITATION FOR VOLUME 2, PRICE/COST PROPOSAL SUBMISSIONS. Information required to be included in any submitted Volume 2, Cost Proposal, is outlined in:

- Sections 8.6.2(a) through 8.6.2(c) of DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002, **and**
- Any additional proposal information required by this solicitation/call (HSHQDC-15-R-B0008).

6.8.2 Subcontractor Cost Submission: Referencing, DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002, Section 8.6.2.b(6), if the subcontractor costs cannot be included with a prime's detailed cost breakdown, then the prime contractor must stipulate on the detailed cost breakdown that the costs presented only represent those from the prime and the subcontractor's costs are provided separately as an attachment to an e-mail sent to BAA-15-R-B0008@hq.dhs.gov. The subject line of the email shall say "Separate Subcontractor Cost Submission – [insert the proposal number assigned from the DHS S&T BAA Portal]". The body of the email shall contain the following:

- i. The prime entities name which should be the same entity that is registered in the BAA portal;
- ii. A POC (name and phone number) from the prime entity; and;
- iii. For each subcontractor proposal attached, include:
(1) The name of the subcontractor for the subcontractor proposal attached; and (2) A POC (name and phone number) from the subcontractor whose proposal is attached.

6.8.3 The separate subcontractor cost proposal must be as detailed as the offerors's cost proposal and must be received at the location designated in the individual call no later than the closing date and time specified by the call. Note that email transmission time may vary depending on the file size of the attachment(s) included in the email. Therefore, ensure there is adequate time for receipt of the email and any accompanying attachments of the subcontractor(s) cost proposal(s) by the required closing date and time. Acceptances of the email submission are dependent upon the actual date and time the e-mail and any accompanying attachment(s) is RECEIVED by the in-box for BAA-15-R-B0008@hq.dhs.gov. NO SEPARATE SUBCONTRACTOR COST PROPOSALS RECEIVED WILL BE

ACCEPTED IF RECEIVED AFTER THE AFOREMENTIONED
PROPOSAL DUE DATE.

6.9 Contractual or Technical Inquiries

- 6.9.1 All contractual or technical inquiries to this BAA solicitation (HSHQDC-15-R-B0008) must be emailed to BAA-15-R-B0008@hq.dhs.gov no later than 4:30 PM Eastern Time on July 5, 2016. Emails submitting questions are to include “Questions for Assured Timing for Critical Infrastructure BAA Solicitation” in the subject line. All questions and responses will be posted as an amendment to this solicitation on Federal Business Opportunities (FBO). Questions will only be accepted and answered electronically.

6.10 Order of Precedence

- 6.10.1 In the event that any of the terms and conditions contained in this solicitation conflict with terms and conditions included in DHS S&T RSD 5-Year BAA HSHQDC-15-R-B0002, the terms and conditions in this BAA solicitation shall take precedence.

Footnotes:

1. National Security Presidential Directive-39, “U.S. Space-Based Position, Navigation, and Timing (<http://www.fas.org/irp/offdocs/nspd/nspd-39.htm>), accessed 5/17/2015.
2. NIPP 2013: Partnering for Critical Infrastructure Security and Resilience, (http://www.dhs.gov/sites/default/files/publications/NIPP%202013_Partnering%20for%20Critical%20Infrastructure%20Security%20and%20Resilience_508_0.pdf) accessed 5/17/2015.
3. DHS Resilient Systems Research and Development Broad Agency Announcement HSHQDC-15-R-B0002; <https://www.fbo.gov/spg/DHS/OCPO/DHS-OCPO/HSHQDC-15-R-B0002/listing.html>